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Assessment of diagnostic radiographers' knowledge of work-related health problems and associated effects: A multicentre study in Ghana

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Abstract

Background: Work-related health problems (WRHPs) are health conditions peculiar to a group of people or occupations including radiography in a specific work setting. These WRHPs occur as a result of prevailing work conditions which predispose workers to risks of physical or psychological distress.

Aim: This study assessed the knowledge of WRHPs among practicing radiographers in Ghana and evaluated the sources, causes, effects and preventive measures of WRHPs.

Methodology: A prospective cross-sectional design incorporating a quantitative data collection approach was used. A questionnaire was used to assess the knowledge and evaluate effects of WRHPs among two cohorts of 31 practicing radiographers at a regional hospital (RH) and a teaching hospital (TH).

Results: An average score of 4.2 (SD=0.4) out of 5 (84.8%) obtained on the knowledge scale indicated very good knowledge of WRHPs among the radiographers. Physical work demands, ergonomic issues, increased workload and stress levels on on-duty radiographers due to sick absence by colleagues, large numbers of daily cases, and extra work without incentives were reported as WRHPs effects mostly experienced by the radiographers. The study also showed no significant difference between gender groups (p=0.313), years of professional practice experience level (p=0.319), and academic qualifications (p=0.287) on knowledge on WRHPs.

Conclusion: Radiographers working in some referral and teaching hospitals in Ghana demonstrated very good knowledge of WRHPs and identified several effects of WRHPs on professional practice.

Implication for Practice: The study concludes that WRHPs predispose radiographers to adverse

health conditions, and administrative protocols are required to prevent or mitigate the burden.

Keywords: Work-related health problems, radiographers, knowledge, effects, management

Introduction

According to the International Labor Organization (ILO), work-related health problems (WRHPs) are health issues or conditions among workers that correlate with certain prevailing conditions (physical, psychological, biological, ergonomic and chemical) at their work stations[1], while the World Health Organization (WHO) defined WRHPs as disorders acquired by virtue of one's exposure to certain risks factors in work environments.[2] The sources or causes of WRHPs have been reported in the literature and categorized as physical, chemical, biological, ergonomic, and psychosocial.[3] A study in the United Kingdom attributed the development of WRHPs to the nature of tasks carried out by individuals in their work settings and concluded that these tasks could contribute to WRHPs which entailed constrained positions, continuous repetitive movements, pressure on small body parts pace of work, and others.[4]

According to Owusu-Mensah,[5] the Constitution of the Republic of Ghana provides individual rights to work under satisfactory, safe and health-friendly conditions, and earn worthy rewards as payment for work done without discrimination, as enshrined in the UN Charter.[6] Radiography practice involves strong and demanding physical efforts such as staying in awkward positions for long periods, bending, lifting and pushing necessary to provide quality patient care.[7,8] The effects of WRHPs are diverse and can be detrimental to the health of occupational staff. Radiographers perform several

respiratory conditions were common.[9,10] In particular, Malik and English[11] reported a 70-90% prevalence of contact dermatitis among work-related skin conditions. Stress has been reported as a major source of WRHPs among radiographers and hence, working under stressful conditions has presented adverse effects on their well-being, resulting in some health-related behaviours.[9] According to Verrier & Harvey[12], occupational stress associated with radiography practice could be identified as

procedures and encounter a number of physical injuries, of which general body pains, skin and respiratory conditions were common.[9,10] In particular, Malik and English[11] reported a 70-90% prevalence of contact dermatitis among work-related skin conditions. Stress has been reported as a major source of WRHPs among radiographers and hence, working under stressful conditions has presented adverse effects on their well-being, resulting in some health-related behaviours.[9] According to Verrier & Harvey[12], occupational stress associated with radiography practice could be identified as

a WRHP effect due to increased workload or decline in staff numbers. This, according to Nakao[13], could further limit the radiographer's ability to positively cause changes to certain lifestyle behaviours such as smoking and inactive behaviours.

In Ghana, available records at the radiology department of a teaching hospital identified stress as a major WRHP which resulted in a combined 30% reduction in the numerical strength, job dissatisfaction and poor work output of radiography staff working in various hospitals.[14] Ofori-Manteaw *et al.*,[7] and Ashong *et al.*,[9] have reported outcomes of studies on work-related stress and ergonomic issues respectively among radiographers in Ghana. Similarly, due to constant technological advancements, work postures and other important factors in the work environment of imaging, several studies with greater emphasis on evaluating the effects of WRHPs among radiographers all over the world have been reported.[9,15] However, their knowledge of WRHPs and associated effects is unknown, as is less reported internationally. WRHPs also have an associated international impact requiring a broader knowledge of its social implications. This study, therefore, assessed practicing diagnostic radiographers' knowledge of WRHPs, their effects and preventive measures.

Methods

This prospective cross-sectional study was carried out in a regional hospital (RH) and a teaching hospital (TH) in Ghana from April to May, 2021. In respect of scope of work, RH is a regional hospital and oversees normal/regular, as well as referred cases from hospitals within the region. Additional to these functions, TH is the largest public tertiary hospital in Ghana. The number and availability of radiology staff (radiographers, radiologists, etc) are expectedly higher at TH. Non-probability purposive sampling was used to select a cohort of licensed radiographers with post-qualification working experience. Thirty-nine practicing radiographers at the study sites were available, out of which 31 who met these criteria completed the survey (79.5% response rate) and consented to participate

were included. Those who declined consent, as well as temporarily licensed radiographers on internship were excluded.

A 35-itemized questionnaire which elicited demographic data, pertaining to the radiographer's knowledge on WRHPs, and for evaluating the causes, sources and effects of WRHP among the radiographers, was used for data acquisition. The instrument was developed following a review of literature to identify the pertinent variables suitable for the study objectives. It was then reviewed by two academic professionals in the field of radiography for content validity. Suggestions for the correction of grammatical errors and ambiguities were made. Thereafter, the questionnaire was piloted among three radiographers on two occasions as a test-retest study, and upon a successful process, kappa reliability analysis was used to evaluate the result which was satisfactory (kappa = 0.781).

The Ethics and Protocol Review Committee of the University of Ghana School of Biomedical and Allied Health Sciences, and the management of the RH and TH Radiology Departments respectively granted ethical approval and permission to carry out the studies. Data were analysed using Microsoft Excel version 13 (Microsoft Corp, Redmond, WA).

Statistical analysis

Descriptive and inferential statistical techniques were used to generate the results using Statistical Package for Social Sciences (SPSS) Version 23 (IBM Inc, Armonk, NY). After collating the Likert scale responses which involved strongly disagree (SD), disagree (D), uncertain (U), agree (A) and strongly agree (SA), marks and grading terminologies were assigned. The knowledge-marking scale ranged from very good knowledge (SA: 80-100%), good knowledge (A: 60-79%), uncertain (U: 50-59%), low knowledge (D: 40-49%), and very low knowledge (SD: <40. Those who failed to provide an answer, however, scored zero. In terms of effects, the same Likert scale responses were used except for the grading terminologies, which included: very high effects (SA: 80-100%), high effects (A: 60-

79%), possible effects (U: 50-59%), minimal effect (D: 40-49%), and very minimal effect (SD: <40). An independent *t*-test was performed to compare the radiographers' knowledge level about WRHPs between gender groups, years of practice and educational level. The percentages as depicted in the figures show the number of radiographers who attained the various scores.

Results

The demographic characteristics of the diagnostic radiographers at the study hospitals are presented in Table 1. There were more radiographers at TH (71.0%) than at RH (29.0%). The population of radiographers was male-dominated in both hospitals (74.2%). Most of the radiographers were aged 40-49 years (38.8%). The group mean age was 40.0 ± 4.1 years. Comparatively, radiographers at RH were relatively older (mean age: 46.7 ± 9.4 years).

Only three (9.7%) had masters' level education. The majority (61.3%) of the radiographers had a bachelor's degree (RH: 19.4%; TH: 41.9%) because many diploma holders had academically upgraded to undergraduate and postgraduate degree levels, resulting in a decreased number of diploma holders (25.8%). Most (67.6%) of the radiographers at both hospitals had worked for 10+ years. The average +/- SD years of professional practice was 8.8 ± 1.4years. A majority (61.3%) of them also worked more than six hours daily in both hospitals.

All the radiographers performed multiple modalities except one radiographer who practiced only ultrasonography at RH. Conventional X-ray imaging was the most practiced modality (RH: 88.9%; TH: 63.6%), while ultrasonography was least performed at both hospitals (RH: 11.1%; TH: 4.5%).

Table 1: Participants' characteristics education, professional practice, and work modality

Demographic		RH		TH		**Total**	
		n	%	*n*	%	*n*	%
Participation		9	29.0	22	71.0	31	100.0
Gender and age							
Gender	Male	6	19.4	17	54.8	23	74.2
	Female	3	9.7	5	16.1	8	25.8
Age (yrs)	20 – 29	0	0.0	5	16.1	5	16.1
	30 – 39	1	3.2	8	25.8	9	29.0
	40 –49	5	16.1	7	23.8	12	38.8
	50 – 59	3	9.7	2	6.5	5	16.1
Mean age		46.7 ± 9.4		37.2 ± 5.0		40.0± 4.1	
Level of education							
Certificate		0	0.0	1	3.2	1	3.2
Diploma		2	6.5	6	19.4	8	25.8
Bachelor's degree		6	19.4	13	41.9	19	61.3
Master's degree		1	3.2	2	6.5	3	9.7
Professional practice experience (yrs)							
1 – 3		0	0.0	2	6.5	2	6.5
4 – 6		0	0.0	2	6.5	2	6.5
7 – 9		2	6.5	4	12.9	6	19.4
10 +		7	22.6	14	45.1	21	67.6
Mean (yrs)		9.6± 3.2		8.5 ± 1.6		8.8 ± 1.4	
Professional practice: Daily working hours							
<6 hrs/day		2	6.5	10	32.3	12	38.7
> 6 hrs/day		7	22.6	12	38.7	19	61.3
Professional practice experience: Imaging modalities							
Conventional X-ray		8	88.9	14	63.6	22	71.0
CT		6	66.7	11	50.0	17	54.8
Dental		0	0.0	3	13.6	3	9.7
Fluoroscopy		6	66.7	6	27.3	12	38.7
MRI		5	55.6	10	45.5	15	48.4
Mammography		5	55.6	3	13.6	8	25.8
Ultrasound		1	11.1	1	4.5	2	6.5

Key: Yrs = years; RH = regional hospital; TH = teaching hospital; ±= SD

In general, CT (54.8%), MRI (48.4%) and fluoroscopy (38.7%) were the most practiced specialized imaging modalities in both hospitals. Mammography was performed by more radiographers at RH (55.6%), while dental radiography was practiced only at TH (9.7%).

Radiographers' Knowledge on WRHPs

The mean knowledge scores based On the Likert scale of 1-5 were 4.1 (SD=0.4) for RH and 4.3 (SD=0.4) for TH, although statistically insignificant (p = 0.340). An average score of 4.2 (SD=0.4) out of 5 obtained on the knowledge scale indicated very good knowledge of WRHPs among the radiographers.

As seen in Figs.1 and 2, many (over 70.0%) the radiographers at both hospitals demonstrated very good knowledge of WRHPs, as indicated by the high scores cited for potential carriers of pathogens, psychological sources, physical causes of infection spread, physical and biological sources of infection spread as key sources of WRHPs.

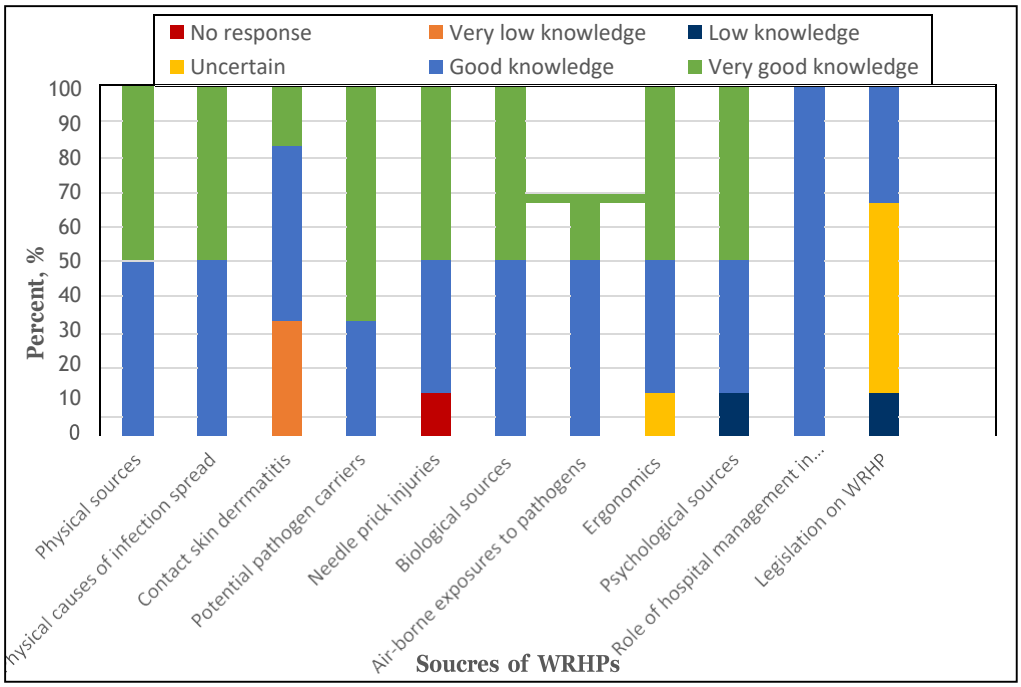

Figure 1: Radiographers' knowledge on WRHPs (RH)

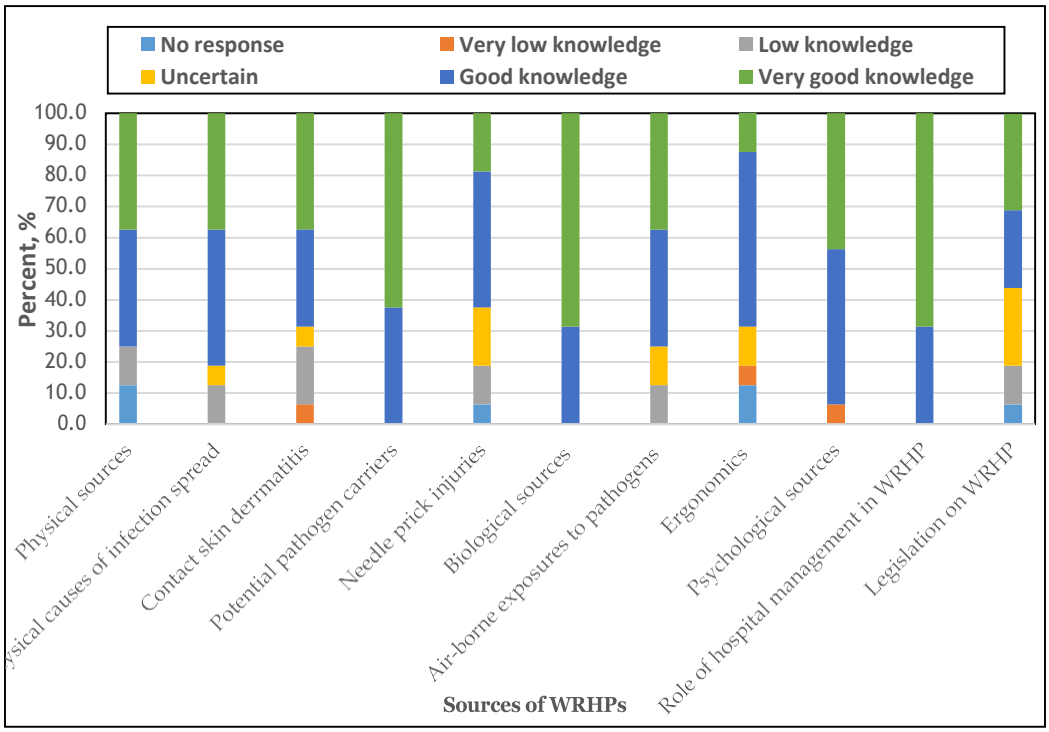

Figure 2: Radiographers' knowledge on WRHPs (TH)

More radiographers at RH (> 50%) were uncertain about legislations that protected workers from WRHPs Moreover, 12.5% of the participants were uncertain about the meaning of work ergonomics.

Effects of WRHPs on Radiographers

The radiographers identified several effects of WRHPs (Figs. 3 and 4) which were categorised as very minimal effects, minimal effects, possible effect, high effect and very high effect. An average score of 3.2 (SD=0.3) (out of 5) implied that radiographers in both hospitals were either affected or sometimes affected by WRHPs. Comparatively, the mean scores of effects obtained for RH were 3.4 (SD=0.3) and TH 3.0 (SD=0.3) respectively, generating a statistically significant difference (p= 0.012).

Over 50.0% of the radiographers at RH categorized unreasonable working hours, on-call duties and extra working hours without incentives, skin irritations from chemicals, respiratory problems, and

daily performance of high numbers of cases as possible effects that contributed to increased stress levels. There were variations in the radiographers' evaluation of the WRHP effects.

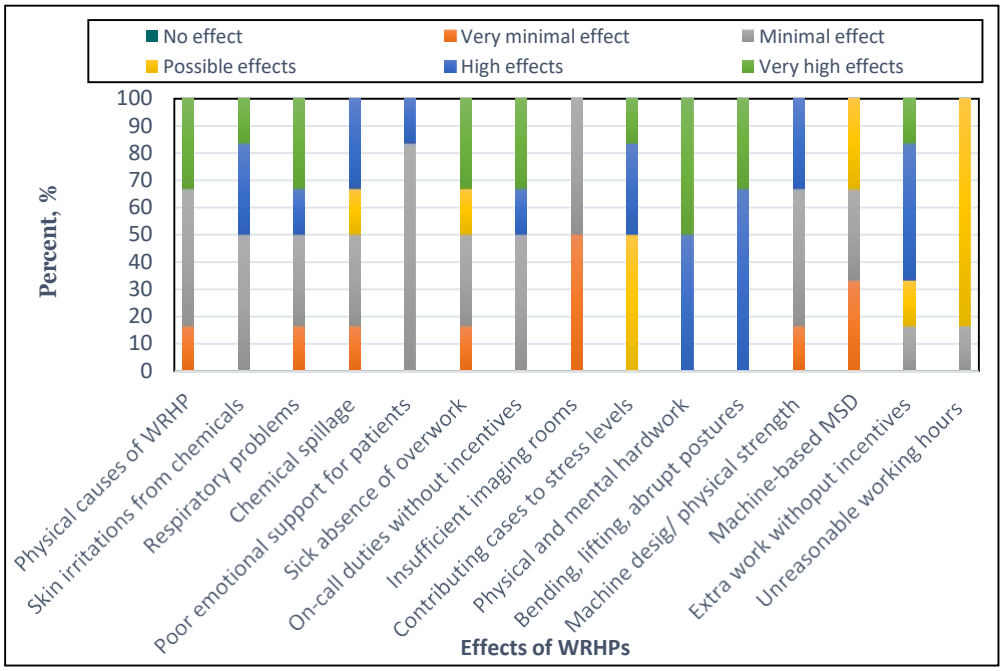

Figure 3: Effects of WRHPs on radiographers at RH

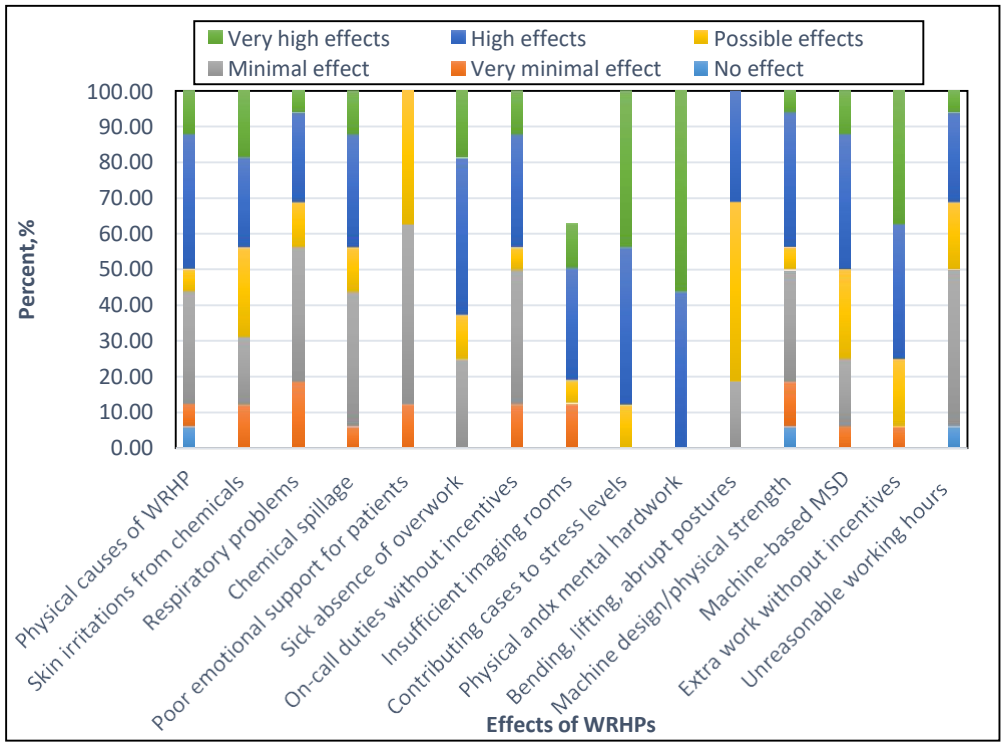

Figure 4: Effects of WRHPs on radiographers at TH

In particular, whereas 80.0% of radiographers at TH described these as high WRHPs effects, about 40.0% of the radiographers at RH described them as minimal effects. Also, about 50% of TH radiographers were minimally affected by unreasonable working hours.

Preventive Measures and Possible Interventions

Further to identifying the sources and causes of WRHPs and the associated effects, the radiographers suggested appropriate and multiple preventive measures and strategic interventions to mitigate, and eliminate the effects, where feasible (Table 2). Equipment maintenance and ergonomics were highly considered as necessary preventive measures and intervention strategies by 55.6% of RH and 54.6% of TH radiographers respectively. Provisions of incentives and flexible work schedules, in-service training and workshops were measures and interventions suggested by RH radiographers (33.3%), while implementation of infection control measures was considered as important by the majority of TH radiographers (68.2%).

Table 2: Preventive measures and strategic interventions

Preventive measures & strategic interventions	RH		TH	
	n	*%*	*n*	*%*
Provision of incentives and flexible work schedules	3	33.3	7	31.8
Recruitment of more radiographers	0	0.0	7	31.8
Equipment maintenance & ergonomics	5	55.6	12	54.6
Implementation of infection control measures	1	16.7	11	68.2
Provision of in-service training & workshops	3	33.3	3	18.2
Improvement of occupational and medical radiation protection	0	0.00	3	18.2
Implementation of health and safety policy, and adherence to protocols	1	16.7	4	27.3

Recruitment of more radiographers (31.8%) and the need for improved radiation protection (18.2%) were considered appropriate preventive measures by only TH radiographers.

Statistically, there was no significant difference between the radiographers' knowledge of WRHPs and their demographics [(gender: p=0.313); levels of education: p=0.287; number of years of professional practice: p=0.319)] (Table 3).

Table 3: Significance between radiographers' knowledge level on WRHPs and demographics

Demographic		Mean of knowledge level of WRHPs	S.D	*p-value*
Gender	Male	4.0	0.4	
	Female	4.1	0.6	0.313
Level of education	Diploma	3.6	0.6	
	Degree	4.3	0.3	0.287
Years of professional practice (yrs)	≤ 9	3.2	0.1	
	≥ 10	4.0	0.5	0.319

Discussions

Demographics

TH is the largest teaching and referral hospital with the largest patient throughput which requires diagnostic radiography services. It also receives the largest number of referrals from many hospitals including RH. This explains the higher number of participating radiographers at TH (71.0%) compared to RH (29.0%). Demographically, the male-dominated population (74.2%) compared to females (25.8%) is consistent with the literature. In particular, Anim-Sampong et al.[16] reported that radiographic practice in Ghana was male–dominated and explained that the perceived fear of the biological effects of radiation on child birth among female radiography practitioners, as well as other associated motivating and de-motivating factors accounted for this.

Conventional X-ray imaging is considered basic, and hence, the most performed modality. On the contrary, the non-availability of specialized imaging modalities such as ultrasonography, CT, MRI, and fluoroscopy at some health facilities explains the low number of radiographers who practiced these specialized imaging modalities. The minimum working hours in public institutions in Ghana is 8 hours. Due to the high patient throughput in both hospitals, a three-shift rotation system of 8 hours is allotted to the radiographers. Accordingly, many of the radiographers at RH and TH worked for more than 6 hours a day. This is supported by Ashong et al.[9] who reported that most radiographers in public practice in Ghana worked more than 6 hours daily.

Radiographers' Knowledge of WRHPs

Physical, Biological, and Chemical Sources of WRHPs

Radiographers at both hospitals demonstrated very good knowledge of WRHPs (without any statistically significant difference), and identified changes in temperature, humidity, air pressure, noise, lightening and vibration as some major physical sources. This is consistent with the definitions suggested by WHO[2] and Volquind et al.[3] Lack of appropriate education on the subject or limited work experience could account for the low-level knowledge demonstrated by some of them. Nevertheless, it could be generally concluded that the majority of the radiographers in these two hospitals had adequate knowledge on the physical sources of WRHPs.

According to Oliveira et al[18] health workers including radiographers are physically exposed to patient body fluids that present risks of infection, while Volquind et al,[3] reported that pathogens like viruses and bacteria could be transmitted via exposure to patient body fluids. Knowing this and the associated occupational and health hazards, all the radiographers from both hospitals admitted that contact with patient body fluids was a major biological source of WRHPs, and further agreed that all patients must be treated as potential pathogen carriers. They also reported external factors like

temperature changes significantly influenced the spread of infections which required preclusion actions like effective and frequent handwashing. Consistent with this, the WHO[2] advocated effective handwashing measures for the prevention of communicable diseases.

Needle prick injuries and glove contaminations were cited as other biological sources of hazards in radiography practice. This study found that more than 60 % of radiographers from RH and 80% from TH knew it. Amosu et al.[19] reported that health workers including radiographers faced diverse WRHPs including blood-borne infections possibly from needle prick injuries and other chemical and stress-related sources which are most reported occupational exposures of WRHPs.

The radiographers knew that contact skin dermatitis was a very common skin disease associated with film processing chemicals and cleaning agents for image processing. This is confirmed by Malik and English[13] who indicated that contact skin dermatitis constituted 70-90% of the chemical-related skin conditions in radiography work settings. Liss et al.[20] also alleged that, radiographers were more prone to the adverse side effects of chemical exposures. However, due to the increasing trend of replacement of film-based radiography systems with computed and digital radiography facilities in Ghana, these disease conditions associated with film processing chemicals and cleaning agents for image processing are becoming a thing of the past.

Ergonomics and Psychosocial Sources of WRHPs

Ergonomics is a study involving the relationship between people and their working environment.[21] Consistent with this, over 70% of the radiographers correctly defined ergonomics as the relationship between the operator and the work tool. Their high level of knowledge could be attributed to their awareness of ergonomics and the prevalence of musculoskeletal disorders among radiographers, as suggested by Ofori-Manteaw et al.[7] On the contrary, Aluko et al[17] found that only 33.8% of Nigerian health workers including radiographers had good knowledge of ergonomics.

This study reported over 85% of the radiographers identified physical abuse, verbal abuse, lack of sleep, stress due to work-overload, and sympathy for patients as psychosocial and psychological sources of WRHPs. In the literature, Harish[22] and Ayatollahi et al.[23] similarly categorized violence, reported emotional drain, depression and tension as psychosocial sources of WRHPs.

Effects of WRHPs among Radiographers and Radiography Practice

The effects of WRHPs were assessed based on the sources and causes of WRHPs. An average score of 3.2 (SD=0.3) (out of 5) implied that radiographers in both hospitals were either affected or sometimes affected by WRHPs. In particular, RH radiographers were mostly affected compared with their TH counterparts (p=0.012. The observed variations could be due to the different working conditions in each hospital. In particular, physical work demands, ergonomic issues, increased workload and stress levels on on-duty radiographers due to sick absence by colleagues, large numbers of daily cases, and extra work without incentives are WRHPs effects mostly experienced by the radiographers. Indeed, all the radiographers at RH and 50% of those at TH were highly affected by excessive bending, lifting and abrupt posture changes, as observed by Verrier and Harvey[12] who also noted that radiography practice entailed a lot of physically demanding tasks which involved patient lifting and turning, carrying of imaging receptors and sending off patients after examinations.

The radiographers also identified the absence of, or poor rewarding system (in some cases) for extra work as a de-motivator. This finding was confirmed in an earlier study that 88.5% of radiographers in Ghana received no rewards for extra work done.[9] According to Chingarande et al.[15] poor rewards and lack of incentives are associated with negative effects of WRHP which motivates public sector radiographers to seek employment in private facilities for better remuneration and incentives. Generally, extra work can induce stress on workers. To mitigate this effect, the participants suggested incentives such as allowances commensurate with the extra working hours or rewards for

extra work done, and periodic massage sessions. They also emphasized the need for compulsory annual vacations, days off and adequate work intervals. This is similarly suggested by Verrier and Harvey[14] that most diagnostic radiographers recommended regular breaks. The radiographers reported that sick absence reported by colleagues and a high number of daily cases resulted in increased stress levels which adversely affected their health and physical wellbeing. Mason[24] also reported that on-duty radiographers experienced fatigue, loss of concentration, and creation of an unhealthy working environment due to increased work load occasioned by the absenteeism of colleagues. WRHPs effects such as cardiac diseases, gastrointestinal problems, high blood pressure, headaches, and musculoskeletal injuries have also been reported.[25]

Recommendations for Appropriate Preventive Measures and Interventions of WRHPs

Legislation

All the radiographers agreed that the prevention of WRHPs was a shared responsibility between the employer and employees, and hence, expected their hospital management to implement workable and sustainable approaches to prevent effects of WRHPs. They also confirmed that awareness of legal frameworks, safety practices and compliance were necessary to prevent WRHPs, as supported by Aluko et al.[17] Subsequently, some of them expressed knowledge of legislations on the work-setting of health workers in Ghana. According to Ashong et al[9], the UK legislations on WRHPs authorises the HSE to ensure that employers (hospital management) enforced policies conformable to standards for employee protection from hazardous conditions. On the contrary, strict adherence to WRHP legislations to ensure the priority of employee safety in Ghana appears absent. The existence of flexible rules and regulations in hospitals reduces the needed priority to prevent WRHPs.[9,26]

Recruitment, Incentives, In-Service Training and Workshops

Low staffing, high patient turn out and unnecessary imaging procedures requested by doctors are some problems narrated by radiographers. Adequate staffing eases the burden of increased workload, provides for free flow of work, enhances quality of work, prevents long patient queues or waiting times at radiology departments, increases patient satisfaction, and reduces work-related stress levels among radiographers. In this regard, almost 32% of the TH radiographers suggested recruitment of more staff as a preventive strategy of WRHPs.

The radiographers in both hospitals further agreed that in-service training sessions and workshops were necessary to address WRHP issues. Consistent with this finding, Ashong et al.,[9] indicated that radiographers did not need post-graduate qualifications to improve working conditions, but periodic seminars and continuous professional development (CPD) activities including in-service trainings and workshops.

Equipment Maintenance, Ergonomics and Infection Control Measures

Many radiographers suggested that attention to ergonomic issues, regular equipment maintenance, and regular quality control (QC) testing were necessary measures to prevent WRHPs related to poor equipment malfunctioning and other technical problems, and ensure safe operation of imaging machines within manufacturers' operating limits and conditions (OLC). This is buttressed by the findings of Chingarande et al.[15] that regular equipment maintenance reduced the number of examination repeats and prevented WRHPs. Modernization of old X-ray machines or acquisition of direct digital systems were suggested by the radiographers in accordance with the benefits of using digital radiography which includes fast image acquisition, retrieval and archiving, and decreased rates of repeat examinations.[9] Recently, digitalized imaging equipment systems were commissioned at RH. On the contrary, the presence of only one direct digital conventional X-ray machine at TH is

indicativethat the radiographers comparatively do more work. This exacerbated the already existing patient positioning-related ergonomic problems.

Adherence to infection control guidelines, wearing of protective clothing and spending minimum time with infected patients were other WRHP preventive strategies suggested by the radiographers. Consistent with this suggestion, Patwary et al.[27] stated that health workers including radiographers were responsible for most WRHPs in India due to poor adherence to safety standards and infection control guidelines. These findings stress the need to implement infection control measures in professional practice, as suggested by the radiographers.

Radiation Protection, Health and Safety Policy Implementations

The academic and professional training of radiography in Ghana provides for efficient use of appropriate devices, achievement of radiation safety via radiation protection principles and applications of current safety standards, legislation, guidelines and regulations, and application of the concepts and tools for radiation protection optimization. In accordance with requirements of radiation protection principles and the associated management strategies, radiographers of TH suggested implementation and compliance with appropriate radiation protection measures and radiation shielding devices at workplaces. This is in line with Volquind et al.[3] who emphasized that radiation protection measures included radiation risk education and the use of radiation shielding devices such as lead aprons to protect radiosensitive body regions of the body.

Implementation of health and safety policies and strict adherence to protocols are important to minimizing WRHPs. In investigating the effects of policies on the minimization of WRHPs in developing countries, Owie et al.[28] concluded that prudent implementation of measures and policies by government and hospital management was required to maintain health and safety at the workplace. Consistent with this, the radiographers recommended the implementation of health and safety policies, and adherence to set protocols in imaging departments as significant approaches to preventing WRHPs.

Conclusion

This study concludes that the radiographers demonstrated very good knowledge on WRHPs. They further acknowledged the negative effects of WRHPs on their health and professional practices. Consequently, the need for effective implementation of policies to ensure health and safety in imaging departments, and preventive strategies against the negative effects of WRHPs were recommended by the radiographers.

Acknowledgment

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Conflict of interest

None declared

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