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Psychosocial stress and its predictors among radiographers in south-eastern Nigeria

AC Ugwu¹ B.Sc (Radiography) M.Sc (Medical Imaging), OF Erondu² M.Sc (Medical Imaging) Ph.D, UB Umeano¹ B.Sc

¹ Department of Radiography, Nnamdi Azikiwe University Nnewi Campus.

² Department of Clinical Imaging, Image Diagnostics, PortHarcourt Nigeria; Department of Radiography, University of Nigeria Enugu campus.

Abstract

Radiographers are particularly prone to psychosocial stress due to heavy workload which may affect their health and work patterns. This study examined the predictors of psychosocial stress among radiographers in south-eastern Nigeria. A total of fifty (n=50) radiographers, drawn from the five states in the region, completed the questionnaire that included sections on demographic data, work environment, predictors of stress and recommendations. The study found no significant difference in the levels of stress experienced by all categories of radiographers. The predictors of psychosocial stress were found to be work-place problems, role ambiguity, role conflict and lack of social support. Work problems and role conflicts appear to have the greatest impact on perceived stress. Role ambiguity was found to be the only predictor of stress that correlated significantly with job satisfaction. The study recommends employment of more radiographers by hospital managers, improved remuneration, clear definition of roles and organisation of stress- intervention programs for radiographers as ways of reducing stress.

Keywords

role-ambiguity, job satisfaction, workload, burnout

Introduction

Work related stress is a common phenomenon among health professionals, arising from a comparison between the demand on the person and his ability to cope [1,2]. Despite extensive research in this area very little has been written that focuses on factors causing stress among radiographers [3] particularly in Nigeria.

Stress includes thoughts, feelings and physiological reactions that occur as a result of stressful events [4]. Stressors on any person may be physical, emotional or environmental in nature and their degree in any single situation will vary considerably due to personal factors, such as training and personality traits. An intense personal evaluation of the demands and ability to cope is known as cognitive appraisal [5]. Following cognitive appraisal, any imbalance in the demand and ability to cope will result in stress, manifesting as feelings of anxiety and frustration. The emotional experience of stress is accompanied by an organized set of responses aimed at reducing the stress and may include both psychological and social processes [1]. Health workers in particular have been shown to be prone to depression and to a state known as 'burnout' characterized by extreme tiredness combined with feelings of failure and frustration [6]. Stress may cause workers to have a negative self-image and lack of concern for themselves or their work and to frequently succumb to absenteeism [7].

The findings of a study conducted at a Manchester hospital revealed that one in 12 health workers, including radiographers, were suffering from mental ill-health which required treatment. This supports the view that health care service presents a stressful environment [8]. Stress for radiographers can emanate either from the work environment or domestic which in turn can impair their capability to function effectively. This is known as spillover and can occur from home to work and vice versa [9]. Predictors of stress among radiographers include role ambiguity, role conflict and work related problems [10]. Rutter and Lovegrove's [10] research methodology and research tool were adapted to suit local needs in this study. Key stressors were identified in a qualitative study of stress among radiographers in south-eastern Nigeria but the relationships between variables were not quantified and investigated [11].

According to the statistics of the Radiographers Registration Board of Nigeria (RRBN) there are about 500 registered radiographers in the country covering a population of about 120 million people whereas the benchmark of the World Health Organization (WHO) is 1:10,000 [12]. Previous studies noted a high exodus of radiographers to more developed and robust economies which exacerbated the situation resulting in the likelihood of an increase in very high work loads [13]. Therefore a link between high work-load

and potential stress among Nigerian radiographers was established [11]. To the best of our knowledge there is no published quantitative study on psychosocial stress among radiographers in south-eastern Nigeria. Variables, such as, job satisfaction and career prospects, in terms of levels of stress among radiographers in this locality, needs to also be explored. The aim of this study is therefore to identify the major predictors and levels of psychosocial stress among radiographers in the said region.

Materials and methods

This was a multicentre study. Participation was voluntary and the respondents were assured in writing that their personal details would be treated as confidential. Approval was obtained from all the respondents to publish the findings hence no other ethical approval was considered necessary. This study was carried out in south-eastern Nigeria which comprises five states: Anambra, Enugu, Imo, Abia and Ebonyi. The study population comprised all radiographers (about 60) employed in public (state) or private hospitals, respectively. Ten radiographers from each of the five states participated in the study (n=50). Participation was voluntary and there were no exclusion criteria. A questionnaire based on the one used by Rutter and Lovegrove [10] was compiled. Closed questions were used to obtain demographic data: sex, age, place of work, qualification, marital status, rank and job

description. Radiographers within the age range of 20 to 40 years were classified as 'young' and those between the ages of 41 to 60 were classified as 'old'.

The measuring tool also tested job-related measures and job satisfaction. This required the respondents to rate their job satisfaction on a six point scale: 1 = extremely unsatisfied and 6 = extremely satisfied. They were asked to rate how they felt about work problems: 1 = strongly disagree to 4 = strongly agree in terms of dealing with patient stress. In terms of role ambiguity they had to rate five statements: 1 = strongly disagree to 4 strongly agree. The same rating scale was used to address statements for role conflict, perceived stress, and social support. For example, the questionnaire statement for the latter was "You often get help and support from your immediate superiors". In addition there was an open-ended question that allowed the respondents to provide their comments on what they think should be done to reduce stress among radiographers.

The key predictors of stress, such as, work problems; role ambiguity; role conflict; perceived stress; social support, were examined in this study. The predictors are considered to be common irrespective of the environment and were therefore retained in this work. The sentences and questions were slightly varied, to reflect environmental differences. The sample size in this study was significantly smaller than that of Rutter and Lovegrove^[10]. However there are not many radiographers in Nigeria and the sample size is considered statistically significant. Sixty (60) copies of the questionnaire were delivered to the radiographers and only fifty (n = 50) completed copies were retrieved.

Data were analyzed using descriptive statistics like mean, median, mode, standard deviation, minimum, maximum, frequency and percentages were used in the analysis of data. Also, inferential statistics like Pearson's Product Moment Correction Co-efficient was done using SPSS Version 16.0. STATGRAPHICS® Version 5.0 was used to test the hypothesis of two independent means; p-values of 0.05 were used as a criterion for statistical significance. Content analysis of comments made by the respondents in the open-ended section of the questionnaire were categorized into sub-themes and analyzed descriptively in percentages.

Table 1: Demographic data

S/N	Classification	Groups	Frequency	Percentages (%)
1	Age	Young	40	80%
		Old	10	20%
2	Sex	Male	34	68%
		Female	16	32%
3	Place of work	Government	33	66%
		Private	17	34%
4	Qualification	DCRs	5	10%
		MSc	5	10%
		BSc	40	80%
5	Marital status	Married	36	72%
		Single	14	28%
6	Rank	Chiefs/Assistant Chiefs	11	22%
		Others (Lower ranks)	39	78%
7	Job description	X-ray only	30	60%
		X-ray and US	14	28%
		US only	5	10%
		X-ray, US and administrative	1	2%

Table 2: Perceived stress level of different groups of radiographers

S/N	Groups	Perceived stress level		
		Mean	Standard deviation	p-value
1	Males	2.29	0.89	
	Female	2.06	0.53	0.34(NS)
2	Young	2.10	0.73	
	Old	2.58	0.92	0.07(NS)
3	Government	2.20	0.77	
	Private	2.25	0.86	0.84(NS)
4	Married	2.32	0.85	
	Single	1.95	0.58	0.14(NS)
5	Chiefs	2.00	0.73	
	Others	2.31	0.82	0.12(NS)

NS = Not significant

Results

The demographic data of the respondents are depicted in Table 1. The respondents are categorized by age, sex, marital status, place of work as well as job status and job description. Table 2 shows the levels of perceived stress. These levels varied with age ranges, place of work and job demands. The mean values of perceived stress in Table 3 are: work problems 2.71;

role ambiguity is 3.09 (the highest value); role conflict 2.11; social support 2.81. It is evident therefore that role ambiguity in this study is an important factor to consider in terms of stress predictors.

Correlation of perceived stress with job satisfaction and analysis of the participants' comments are presented below from highest to lowest:

Table 3: Descriptive statistics showing job satisfaction and predictors of stress.

S/N	Satisfaction & predictors	Median	Mode	Minimum	Maximum	Mean	Standard deviation
1	Job satisfaction	4.00	4.00	1.00	6.00	3.98	1.08
2	Work problems	2.67	2.50	1.50	3.83	2.71	0.58
3	Role ambiguity	3.00	3.00	1.00	4.00	3.09	0.69
4	Role conflict	2.17	2.33	1.00	3.33	2.11	0.60
5	Perceived stress	2.00	2.00	1.00	4.00	2.22	0.80
6	Social support	3.00	3.00	1.00	3.67	2.81	0.56

- Employment of more radiographers (25.9%)
- Use of ultra-modern equipment with ergonomic design (18.8%)
- Better pay package (17.7%)
- Conducive working environment (15.3%)
- Duty scheduling (8.2%)
- The Radiographers' Registration Board of Nigeria should protect a good image of radiographers in the hospital setting (8.2%)
- Rest and relaxation after work (3.5%)
- Booking cases (2.4%).

Discussion

The main purpose of this study was to assess the levels and major predictors of psychosocial stress among radiographers in south-eastern Nigeria. A total of thirty four (34) males and sixteen (16) females, whose ages ranged between 20 and 60 years, participated in the study. Thirty-five respondents (66%) work in state (government) hospitals and 17 (34%) work in private health establishments. Five participants (10%) had obtained a professional diploma/certificate; 40 (80%) had bachelor degrees in radiography and five (10%) had post-graduate masters degrees. Thirty-six participants (72%) were married and

28% were single. With regards to job description, five participants (10%) perform only ultrasound imaging; 30 (60%) only perform diagnostic imaging; 14 (28%) provide service delivery in both imaging modalities. One participant performed both diagnostic and ultrasound examinations as well as doing administrative tasks.

A test of hypothesis of two independent means for the different categories of radiographers was performed. For young (20 - 40 years old) and old (40 - 60 year old) radiographers, the p-value is 0.07 and 0.83 for government and private workers. Finally, the p-value for chief radiographers and others is 0.21; which means there is no significant difference in the perceived stress level between the males and females in both age groups irrespective of their marital status, professional designations and place of employment. An earlier work showed a higher perceived stress among the senior categories of radiographers and is at variance with our findings^[10]. Sex and marital status did not contribute to perceived stress; this is in agreement with the findings of Eslick and Raj^[14]. No difference in stress was noted between radiographers who worked in either the public or private health sector.

Mean ratings of the responses to the questionnaire items were computed

and used to assess stress levels. Using a 4-point Likert scale, 2.0 (50%) was used as a cut-off for perceived stress: mean ratings < 2.0 do not indicate high level of stress while mean ratings > 2.0 indicate a high level of stress.

Utilizing Rutter and Lovegrove's^[10] template our study revealed similar findings: work problems, role ambiguity, role conflict, and social support problems, are high predictors of stress among radiographers working in south-eastern Nigeria. Role ambiguity is a situation where the role expectations and specification are not explicitly spelt out. This is a common scenario in Nigerian health systems and is exacerbated by staff shortages. Role conflict occurs when the messages and cues from others about one's role are clear but contradictory or mutually exclusive. In Nigeria, role conflicts are common between radiologists and radiographers, especially in areas such as ultrasound and basic film interpretation. This limits the possibility of role extension and may contribute to stress. Work problems might be defined as problems that are associated to the workplace. Social support problem refers to a situation where there is lack of help from other team members and has been identified to be weak or non-existent in the relevant literature^[11]. Problems relating to social support include poor attitude of management to radiographers' complaints, inappropriate booking methods by superiors, call duty listings and difficulty in getting relief when needed.

Perceived stress correlated highly and significantly with all the predictors of stress, namely: work problems ($r = 0.62$); role ambiguity ($r = -0.31$); role conflict ($r = 0.53$); social support problems ($r = -0.55$). Role ambiguity was found to be the only predictor of stress that correlated significantly with job satisfaction. The relationship between role ambiguity and job satisfaction appears paradoxical as it indicated an increase in satisfaction with

Table 4: Pearson product moment correlation of perceived stress with job satisfaction and predictors of stress.

S/N	Predictors of stress	Perceived stress		Job satisfaction	
		r	p	r	p
1	Work problems	0.62	0.00(S)	-0.16	0.26(NS)
2	Role ambiguity	-0.31	0.03(S)	0.35	0.01(S)
3	Role conflict	0.53	0.00(S)	-0.30	0.07(NS)
4	Social support	-0.55	0.00(S)	0.26	0.07(NS)

Where "r" represents Pearson Correlation Co-efficient; "p" represents the value of p; "S" represents Significant i.e. if $p < 0.05$ and "NS" represents Not significant i.e. if $p > 0.05$.

role ambiguity. This finding may be explained by the seemingly carefree attitude among radiographers on the issue of role ambiguity.

This study attempted to correlate perceived stress with job satisfaction. The Pearson value 'r' is -0.20 ($p > 0.05$) and this shows that there is a negative and insignificant correlation between perceived stress and job satisfaction. This is contrary to a previous study^[10] which showed a negative and significant correlation between perceived stress and job satisfaction with Pearson value 'r' as -0.37. Furthermore, previous studies have reported that superintendents (chief radiographers) have a significantly greater level of stress than their junior colleagues (lower grade radiographers/others)^[7,10]. However, it should be noted this study showed no significant difference in the perceived stress levels between chief radiographers and others. It is possible an increased workload for all radiographers in the study has resulted in similar stress levels. Of note, is that in another study^[14] no difference was evident in the levels of stress between private and public (government) practices. This study concurs with these findings and could be due to the fact that some government employed radiographers also locum after hours in some private hospitals.

This study also aimed to find out the major predictors of psychosocial stress among radiographers. Role conflict showed a higher correlation with perceived stress than role ambiguity^[10] and was found to be evident in the present study; role conflict showed a higher correlation ($r = 0.53$) with perceived stress than role ambiguity (-0.31). Furthermore, the same study showed perceived stress level was high for all the predictors of stress which was also noted in the present study^[10]. It must be noted that questionnaires may lead respondents to exaggerate their distress and dissatisfaction. Comparisons with other studies are difficult to make in view of different research methods but the general impression is that radiographers are prone to work related stress. One study on occupational stress and the radiographer identified role conflict (with superiors) and role ambiguity (responsibility without authority) as important stressors^[15]. This is in line with the findings of the present study as role conflict and role ambiguity were also found to be important stressors alongside work problems and social support problems. The high score for role ambiguity and the least correlation

between role ambiguity and perceived stress indicates over-exaggeration of role ambiguity and apparently high expectation among radiographers. The weak correlation between job satisfaction and perceived stress indicates that there are other strong confounding variables that affect job satisfaction other than stress among radiographers in the region of the study. This is not in agreement with the study by Rutter and Lovegrove^[10] as they reported a strong correlation between stress and job satisfaction.

The majority of respondents believe that employing more people is the best way of reducing stress among radiographers. They also indicated that the use of ultra-modern equipment, with ergonomic facilities, is another effective way of reducing stress. Pre-booking of patients did not feature highly in their comments. The respondents' comments are in line with the systems theory of stress as it is concerned with organizational structure and the factors in it that can induce stress among staff. Previous studies note that organizations, such as hospitals, consist of three sub-systems that constantly interact with each other and with organizational manners in ways that can induce stress in radiographers^[16-18]. The first sub-system is the physical-technical environment which provides the context within which radiographers carry out their duties. This environment has several sources of stress which include work-overload, task difficulty, and task ambiguity. The socio-interpersonal framework is the second sub-system. It defines the social framework with which the focal person interacts with superiors, subordinates and peers and is characterized by role ambiguity, role conflict, work problems, and social support problems, as potential sources of stress. Finally, the person sub-system is concerned with personality characteristics which a radiographer brings to the work place and which has the potential to reduce or escalate the stress he or she can experience and tolerate. Some of the personality traits include age and gender. Issues relating to age and gender were not contained in the comments made by radiographers^[16-18].

The top- three cited measures of reducing stress are congruent with the physical-technical environment; the fourth and fifth most cited comments are in tune with the socio-interpersonal framework. The comments of the respondents tally in the same order with the systems theory of stress as propounded by several authors^[16-18].

Conclusions and recommendations

Psychosocial stress is a common occurrence amongst all radiographers. There is no difference in the levels of stress between government and private sector workers, male and female radiographers, chiefs and others, young and old radiographers, married and single radiographers. The majority of stress experienced is moderate to severe. The major predictors of stress for radiographers, is role ambiguity. Psychosocial stress among radiographers is obviously important as it affects not just the health of radiographers, but also their quality of life, their work and retention factors.

Radiographers in general are exposed to a great deal of stress (greater than 50% cut-off value). The predictors of psychosocial stress are work problems, role ambiguity, role conflict and social support. Role ambiguity is the major predictor of stress among radiographers in south-eastern Nigeria. The findings also showed a weak negative correlation between perceived stress and job satisfaction. Perceived stress also correlated with the predictors of stress: role ambiguity, role conflict, work problems, and social support problems. This high level of stress could cause 'brain-drain', burn out and voluntary termination/resignation of employment.

In terms of the findings from the study it is recommended that the management of hospitals should (i) employ more radiographers in order to reduce the workload, thereby reducing stress, and (ii) clearly differentiate roles to avoid stress that results from role ambiguity which is a situation where the role expectations and specification are not explicitly spelt out. In addition lectures on stress and time management should be regularly provided for radiographers in order for them to gain useful knowledge and improve on their stress management skills.

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