Radiography xxx (2018) 1–5

Contents lists available at ScienceDirect

Radiography

journal homepage: www.elsevier.com/locate/radi

Knowledge and practices of radiographers regarding infection control in radiology departments in Malawi

D. Nyirenda [a], W. ten Ham-Baloyi [b, *], R. Williams [c], D. Venter [d]

[a] Department of Radiography, Faculty of Medical Sciences, Malawi College of Health Sciences, Off Mzimba Street, Lilongwe, Malawi
[b] Faculty of Health Sciences, Nelson Mandela University, 3 Gomery Avenue, Summerstrand, Port Elizabeth, South Africa
[c] Department of Radiography, Faculty of Health Sciences, Nelson Mandela University, 3 Gomery Avenue, Summerstrand, Port Elizabeth, South Africa
[d] Faculty of Health Sciences, Nelson Mandela University, South Campus, Summerstrand, Port Elizabeth, South Africa

ARTICLE INFO

Article history:
Received 19 September 2017
Received in revised form
4 January 2018
Accepted 8 January 2018
Available online xxx

Keywords:
Infection control
Knowledge
Practices
Radiographer
Radiology departments
Malawi

ABSTRACT

Introduction: Adherence to standard infection control precautions (SICP) by radiographers is critical in combating healthcare associated infections (HAIs). Therefore, radiographers need to have adequate knowledge and practices of infection control if they are to contain the magnitude of HAIs.
Methods: Purposive, all-inclusive sampling was used to recruit 62 radiographers from four government referral hospital in Malawi. Radiographers' knowledge and practices of infection control were determined using a self-administered questionnaire. Data collection was carried out in January 2017. Descriptive (e.g. mean and standard deviation) and inferential (Chi^2 test) statistics were generated using an MS Excel VBA application.
Results: The majority of the respondents (84%) were between 20 and 39 years of age. The study results revealed that radiographers in the four hospitals had mean infection control score (percentage) of 76.8 ± 12.6 for knowledge and a mean infection control score of 65.3 ± 16.1 for practice. A slight significant association between age and knowledge ($p < 0.05$; Cramer's V 0.26) was found in that radiographers between 40 and 59 years of age (majority of the sample) obtained higher knowledge scores than those 20–39 years of age.
Conclusion: Given the results, further training is required regarding infection control among radiographers in radiology departments in Malawi. A guideline for infection control, specifically contextualised to be used by radiographers in radiology departments in Malawi, should be developed and implemented to enhance adherence to SICP in these departments.

Background

Infection control is concerned with controlling the spread of healthcare associated infections (HAIs) acquired by patients while receiving care within a healthcare setting.[1] According to the World Health Organization,[2] infection control is acknowledged universally as a solid, and essential basis, for patient safety; it supports the reduction of HAIs and related consequences and promotes health.

Standard infection control precautions (SICPs) are designed to control HAIs from recognised and unrecognised sources of infection and include: hand hygiene, personal protective equipment, occupational exposure management including sharps, safe care of linen, uniforms, and safe waste disposal.[3,4]

Infection control procedures applied in radiology departments constitute ideas borrowed from SICP, and are classified into two broad categories: routine departmental cleaning, and personal practices.[5] Routine departmental cleaning covers cleaning of counters and surfaces that are frequently in contact with personnel who:

- handle patients,
- open and close storage areas containing linen, non-sterile medical supplies, and sterile supplies,
- use lead rubber aprons and gloves, mobile x-ray machines, x-ray machines, tables, vertical Bucky stands, wheelchairs and stretchers.[5–7]

* Corresponding author. Fax +27 0 41 504 2616.
E-mail addresses: nyirendadenis@yahoo.co.uk (D. Nyirenda), Wilma.tenHam-Baloyi@mandela.ac.za (W. ten Ham-Baloyi), Razana.Williams@mandela.ac.za (R. Williams), Danie.Venter@mandela.ac.za (D. Venter).

https://doi.org/10.1016/j.radi.2018.01.002
1078-8174/

However, routine departmental cleaning may not be enough to combat infection.[8] Attention therefore needs to be given to the practices of personnel in a radiology department. All personnel in a radiology department should apply infection control measures, including hand hygiene and good personal hygiene.[4,5,9]

Radiographers should, therefore, have adequate knowledge and practices regarding infection control, with the aim of controlling and reducing the spread of infectious diseases.[10] However, compliance with SICP among radiographers, has been consistently highlighted to be low worldwide.[11,12] Poor adherence to infection control by radiographers could lead to an increase in HAIs which also escalates the cost associated with infection control.[13] Such expenditure negatively affects the already limited budgets of radiology departments in countries such as the United Kingdom.[14] The same applies to radiology departments in Malawi. This study therefore aims to determine the knowledge and practices of radiographers regarding infection control in radiology departments in government referral hospitals in Malawi. The study was the first of its kind to be conducted in this setting and was part of a bigger study that was conducted to develop a guideline for infection control for radiographers in radiology departments in Malawi.

Methods

This quantitative study used a survey design and was conducted by the first author under supervision of the second and third authors in January 2017 at radiology departments in four government referral hospitals in Malawi. In Malawi, there are 31 radiology departments: 27 in government district hospitals and four in government referral hospitals (hereafter referred to as hospital A, B, C and D). The four hospitals were selected as the only hospitals in Malawi that conduct invasive procedures, and thus present an increased risk for HAIs. An all-inclusive, purposive sampling method was used to select the radiographers for the study, which included mobile and theatre radiographers as in Malawi, any radiographer can go for a radiographic examination in either ward, radiography or theatre. Radiographers who were on leave and those who were carrying out mobile radiography in wards or theatres on the day of collection of data were excluded. Permission for the study was given by the Faculty of Health Sciences at the relevant University (H16-HEA-RAD004), directors of hospitals A, B, C and D, (ethics numbers MCH/16/10/04; KCH/nhsrc2016, ZCH/16/09/29; and QEC/GEN/2) and the National Health Sciences Research Council (ethics number 16/12/1707) in Malawi. Verbal informed consent was obtained from respondents, and survey results were kept confidential.

Survey questionnaire

The data collection instrument was a pre-tested, self-administered questionnaire derived from an existing questionnaire,[15] and amended, with permission from the developers, by the first author. The questionnaire addressed the following four sections:

a) The respondents' demographic data, i.e. gender, age, level of education and work experience as a qualified radiographer;
b) The level of knowledge of radiographers regarding infection control in radiology department (16 statements with three-point Likert Scale “Agree”, “Disagree” or “I don't know”);
c) The practices of radiographers regarding infection control in radiology department (16 questions with three-point Likert Scale “Always”, “Sometimes”, or “Never”);
d) Additional questions regarding infection control (four questions): two closed-ended questions regarding the attendance at occupational in-service trainings on infection control, and two open-ended questions regarding the factors affecting the implementation of infection control as well as recommendations to improve infection control in radiology departments.

As part of the process to validate the questionnaire, a pilot test was conducted in radiography departments in two conveniently selected government district hospitals in Malawi. These hospitals were chosen because the infection control principles the radiographers must adhere to are the same as in the government referral hospitals included in the study and the hospitals were close to where the first author resides. Six radiographers (three participants from each hospital) were conveniently selected and recruited to participate in the pilot study in order to ensure validity and reliability of the questionnaire. The questionnaire was adjusted based on minor ambiguities that were identified by the respondents.

Data processing and statistical analysis

Completeness of the self-administered questionnaire was checked before capturing the data using a Microsoft Excel spreadsheet. Descriptive and inferential statistics were employed to analyse the questionnaire data and the derived knowledge and practice scores. Frequency distributions were used to describe the sample. Inferential statistics, i.e. Chi-square tests with Cramer's V values as measures of practical significance were used to test the relationships between variables. A Visual Basic for Applications (VBA) package, developed by the fourth author on a Microsoft Excel platform, was used for both descriptive and inferential statistics.

The scores for knowledge and practices were calculated as percentages.

Knowledge score = (Number of correct responses to knowledge items 1–16)/16 × 100.

Practice score = (Number of “Always” responses to practice items 1–16) × 2 + (Number of “Sometimes” responses to practice items 1–16)]/32 × 100.

The correctness of the responses on the questions were decided upon based on available literature. Quartiles 1 and 3 were used to separate respondents into three groups: lower group: score less than quartile 1; middle or average group: score between (inclusive) quartiles 1 and 3; and higher group: score greater than quartile 3. This technique ensures (depending on the number of duplicate scores and whether the sample size is divisible by 4) that approximately 25% of the respondents are in the lower group, 50% in the middle or average group and 25% in the higher group. For this study, knowledge scores ranging from 38.00 to 69.00 indicated low knowledge; scores between 69.0 and 88.00 indicated average knowledge; and scores between 88.00 and 100.00 indicated high knowledge. Practice scores ranging from 41.00 to 50.75 indicated low practice, scores between 50.75 and 77.25 indicated average practice, and scores between 77.25 and 97 were an indication of high practice.

Results

A total of 62 self-administered questionnaires were completed out of 80 (response rate of 77.5%). The demographic characteristics of the respondents are presented in Table 1.

From Table 1 it is clear that most respondents were males (85%) and that the majority were between 20 and 39 years (84%). As many as 75% were in possession of a diploma, whereas only 3% had a

Please cite this article in press as: Nyirenda D, et al., Knowledge and practices of radiographers regarding infection control in radiology departments in Malawi, Radiography (2018), https://doi.org/10.1016/j.radi.2018.01.002