



SYSTEMATIC REVIEW ON THE MEDICAL PRACTITIONER'S KNOWLEDGE ABOUT THE RADIOLOGY EXAMINATION AND POSITIVE INFLUENCE OF RADIATION TRAINING

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ABSTRACT

The aim of this systematic review is to search for all available publications on surveys assessing medical practitioner's knowledge on radiation doses and radiation risks of radiology examination. Acochrane systematic review was performed using four databases.211 reference were found. Only primary studies assessing the medical practitioner's knowledge on radiation doses and radiation risks of radiology examination were included The outcome of the systematic literature shows that only a minority of medical practitioner were well informed about these topics in almost all studies we found. However the different methodologies of the 17 included studies render an interpretation difficult. Nevertheless, this systematic review implies that radiation protection awareness among physicians particularly for patient medical practitioner could be improved. The review did not asses the studies by a quantitative and qualitative synthesis, which could have helped in scoring the studies on the basis of the indicators.

KEYWORDS: radiation, awareness, medical practitioner



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INTRODUCTION

Radio-diagnosis and Imaging plays a vital role in the modern medicine by providing clinical services in diagnostic radiography, interventional radiology, ultrasonography and cross section imaging. The imaging modality used in radiology department excluding ultrasonography (USG) and magnetic resonance imaging MRI use ionizing radiation for diagnostic and therapeutic procedure. Although the benefit of ionizing radiation outweighs the risk involved in the ionizing radiation used for diagnosis, there is a growing concern over the biological effect of ionizing radiation¹². The ionizing radiation exposure from the imaging equipment's particularly from the computed tomography has been topic of concern in scientific and public discussion³⁴. Increased use of radiology examination particularly in computed tomography examination contributes greatly to the individual population dose⁵. The exposure to the patient can be reduced through the dose reduction techniques, or by proper justification⁶⁷. There is some evidence that radiologists generally adhere to published guidelines on dose reduction. However, medical practitioner's awareness of radiation risks and knowledge of suitable alternative examinations is a major requirement to reduce CT use in patients. To further explain this topic, we conducted a literature-based study to elucidate knowledge on radiation risks associated with radiological examination among medical practitioner.

Objectives

The aim of this systematic review is to search for all available publications on surveys assessing medical practitioner's knowledge on radiation doses and radiation risks of radiology examination. The systematic review needs to answer the following questions:

- Are the medical practitioners aware of biological effect of radiation?
- Do a medical practitioner inform the benefit and risk of radiology examination which the patient is undergoing?
- What is the medical practitioner awareness about the MRI and USG?

Methodology

Criteria for considering studies for review

a. Type of Studies

- Cross sectional study
- Systematic review

b. Type of Participants

- Physicians who prescribe for the radiology examination

Restrictions on language of study: Only studies published in English language

1. Database searches of published and unpublished literature
2. Internet searches for published and unpublished literature
3. Manual searches of books
4. Cross referencing of studies (recent ones)

Databases

- Pub med
- Elsevier
- Cochrane Reviews
- Medline

Relevant portals

- Google Scholar
- www.cochrane.org
- pubmed.gov

practitioners	knowledge	ionizing radiation	diagnostic imaging	Case study
a. Doctors	b.Awareness	c.Radiation exposures	d.Radiology examination	e.Case report
a. Referring physicians	b. Patient	c.Medical imaging radiation dose and risk	d. Deficient	e.Animal study
a.Health professional	b.Justification	c.Electromagnetic radiation	d.Medical imaging	e. Case history
a. Pediatrician	b.Estimate	c. Radiation risk	d. Computer tomography	

Keyword combination relating individual words can be a+b+c, a+b+c+d, a+b+c+d+e

Selection of studies - Priorities

1. MRI and ionizing radiation
2. USG and ionizing radiation
3. Positive influence of course attendance on overall knowledge found
4. Knowledge of radiation hazards

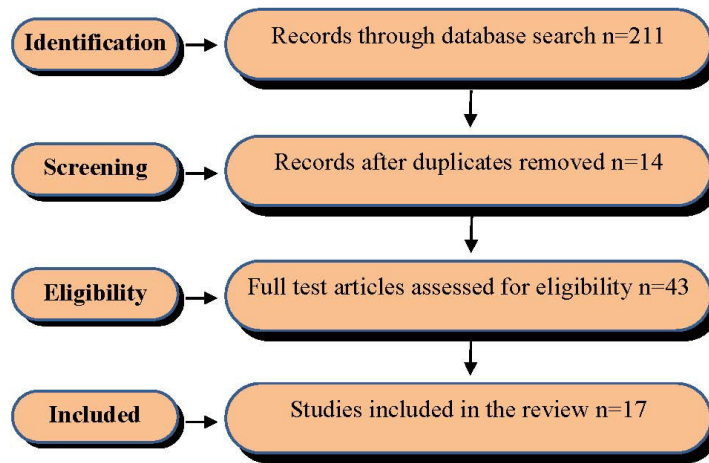
Data Extraction

Author
 Year
 Countries
 Study sample
 MRI and ionizing radiation
 USG and ionizing radiation
 Risk and benefit communication
 Positive influence of course attendance on overall knowledge found
 Knowledge of radiation hazards

Previous radiology examination discussion

Figure 1.1

Flow diagram depicting study selection for Systematic review medical practitioner's knowledge about the radiology examination and Positive influence of radiation training



RESULTS

Characteristics of the included studies

The table 1.1 depicts the summary of the twenty one included studies which was reviewed for this systematic review. Most of the studies were published after 2003. Meta-analysis for the selected studies has not been done

due to the strong disparities in the studies. The information used in the studies are published in the original research paper and did not perform any new calculations. Eg:- Previous radiology examination discussion, knowledge of radiation hazards for the doctors etc.

Table 1.1
Summary of the studies in the systematic review

Author and year	Countries	Study sample	MRI and ionizing radiation	USG and ionizing radiation	Positive influence of course attendance on overall knowledge found	Knowledge of radiation hazards
2003 ^a	South Wales and Oxford	130	92% recognize	95 recognize		
2004 ^a	Hospital, Plymouth, UK	240	71.6recognize	90.4recognize		
2007 ^{uv}	Turkish	156	27.4%failed	4%failed		
2007 ^{vi}	Dublin, Ireland	269	25failed			
2008 ^a	USA				#	
2010 ^a	Bergen, Norway	200	44%failed	45%failed		
2010 ^a	Norway	213	10.5failed	4.8 failed		
2011 ^a	Hong Kong	133	65% recognize	100 % recognize		
2011 ^a	Hong Kong	80	15 % failed	5%failed		93% not discussed
2012 ^{vi}	Germany	811	80.0%recognize	90.5%recognize		
2012 ^a	28 countries	728				15.3% Had discussed
2013 ^a	Europe	124	21.7%failed	66.1%recognize		
2013 ^{uv}	Australia	608	2.8% failed	1.8%failed		
2013 ^{vi}					##	
2013 ^{uv}		403			###	
2014 ^{uv}	Sub-Saharan African Country, Cameroon	151	41.1% failed	2.6%failed		42.4% Had discussed
2014 ^{uv}	Turkey	300	86 %recognize	92.7%recognize		

Imaging modalities and ionizing radiation

In our systematic review 76.6 % (13 out of 17 studies) of the studies had included the question radiation exposure from the UGS and MRI. Between 2.8% to 41.1% failed to recognize MR as radiation-free modalities studies. Similarly, 1.8% to 45% failed to recognize USG as radiation-free modalities. The responses vary in year of publication, country, and study design and study quality. In contest of high proportion of correct answer about the

USG with respect to the radiation, a prospective questionnaire study of doctors in a university teaching hospital in Hong Kong shows 100% correct answer¹⁵

Positive influence of radiation training

In our review out of seventeen studies only, three studies evaluate the influence of radiation training among the medical practitioners. However, there is no significant increased radiation knowledge was found^{12,122}.

#A focused education to the interventional radiology staff (IR) reduces the radiation dose and dose related complication to the patient and staff member during the interventional procedure¹²

There is an increase in knowledge of the doctors, who are undergoing the starting refresher radiation courses.²¹

Awareness of radiation dose and dose related hazards were poor among the doctors. However, it can be improved by creating awareness and teaching the targeted doctors.²²

Medical Practitioner and Patient Communication

In our systematic review 17.6 % (3 out of 17 studies) of studies had explained the communication between the medical Practitioner and patient about the radiation risk involved in the procedure. A prospective survey using a web-based questionnaire conducted by International Atomic Energy Agency study among the doctors , includes samples from developed (52.3%) and developing countries (47.7%)shows that 15% of the medical Practitioner from the developed countries and 15.6% from the developing countries always ask patients about previous examinations involving radiation²³.There

is no significant different between the developed and developing countries.

DISCUSSION

This systematic review of our studies mainly focused on the influence of radiation course on overall knowledge found and communication between the patient and doctors regarding the previous radiology examination. We performed the systematic review in 4 data bases result in 211 articles. 17 primary research articles which highlight our study objective were considered for the final analysis in our studies. Out of 17 studies only 3 studies

reported the patient doctor's communication. The outcome of the studies shows that there is a poor communication which ranges from 7% to 42.4%. The common finding was moderate, in some case even a low level of radiation knowledge. The most of the studies included in reviews are questionnaire based studies and only one Systematic review considered for our review. The concerns about risk and its communication have been a major preoccupation of this Consultation. Thus the importance of both patients and healthcare professionals knowledge and skillful communication cannot be overestimated. There are three studies which focused on the influence of course out of which two studies had shown dramatically improve by means of a limited teaching effort through targeted training and one study reported an increase in knowledge since starting refresher courses. The studies conducted in the Derriford Hospital, Plymouth, UK demonstrated an urgent need of medical doctors to improve the knowledge of radiation exposure (20).

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CONCLUSION

We conducted a systematic literature review to include all available information on physicians' knowledge about radiology examination and associated health risks. Only a minority of medical practitioners were well informed about these topics in almost all studies we found. However the different methodologies of the 17 included studies render an interpretation difficult. Nevertheless, this systematic review implies that radiation protection awareness among physicians particularly for patient medical practitioners could be improved.

Limitation of the review

The review did not assess the studies by a quantitative and qualitative synthesis, which could have helped in scoring the studies on the basis of the indicators.

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