

Sudanese Radiologic Technology Specialist Embrace A challenge: Focus on Image interpretation -A survey Study

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ABSTRACT

INTRODUCTION: Image interpretation by radiographer is remains unlicensed in Middle East and most of underdevelopment countries. Worth noting there is some narrowing role in Kingdom of Saudi Arabia (KSA) carried out by Sudanese health practitioners. Despite many previous studies have confirmed widespread in implementation of this role in developed countries.

METHOD: A cross-sectional and a quantitative study was undertaken to provide a deep insight into the issue of image reporting by Sudanese Diagnostic Radiologic Technology Specialists (DRTSs) who have found the opportunity in image reporting seriously and applied outside the country specifically in KSA. So the sample of this study included DRTSs working in KSA.

RESULTS: A response rates of 67.65% was male ($n = 23/34$) and

32.35% female ($n = 11/34$) were achieved. They are writing images reports in medical centers 88.6% ($n = 31/34$) but less in hospital. Statistical inference was noted a significant associations between qualification, work area, workplace, and the personal efforts which give the participant ability to succeed on writing images report (p -value = 0.001, 0.000, 0.000 and 0.016) respectively. 32% of the respondents wrote images reports increases than 5000. More than half of the respondents didn't wrote any wrong report and this was revealed a significant correlation with an experience p -value < 0.05. Chest X-ray considered the highest reports ≥ 500 (32%).

CONCLUSION: This study explores the significant role that DRTSs are making to image reporting in KSA, although there is a big concerns to sustain this vital role.

Key words: Image interpretation; Diagnostic Radiologic Technology Specialists

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INTRODUCTION

In spite of the fact that, the quite enough qualified Diagnostic Radiologic Technology Specialists (DRTSs) in Sudan, radiographic image interpretation by them still remains a challenge^[1]. The abbreviation DRTSs is used here to represent a practicing professional in diagnostic radiography who hold BSc in medical radiation sciences and above which in some country called radiographer.

Globally, an important article by Cynthia Cowling (A global overview of the changing roles of radiographers) carried out in 2008 showed that the International Society of Radiographers and Radiological Technologists (ISRRT) provides a meeting to discuss this changes and developments in the radiographic profession, also study identified that radiographers role has a huge changing and expanding^[2]. In the United Kingdom (UK) image interpretation by radiographers have been recognized for over 20 years^[3,4,5]. This tasks

has been introduced into new clinical responsibilities, especially at consultant and advanced practitioner levels. There is a clear evidence of how this contribution to service delivery impacts on patient outcomes and staff experience and a recent study showed that radiographers interpreted 60% of trauma radiographs in hospital^[6].

UK and USA considered the pioneer where have developed, expanded roles and published several articles on this issue^[7]. The American Society of Radiologic Technologists (ASRT) has already established its Radiologist Assistant role^[8]. Boundaries for radiographers roles around the world are changing and expanding. This variety is also found in Africa such as Democratic Republic of Congo, South Africa, Kenya and Uganda which emphasizes the problem of low doctor/patient ratio^[9,10]. All these countries were affected by many factors introduced by Buchan for WHO in 2002, such as skill shortages, cost, quality improvement, technological innovation, new in medical interventions and health sector programmes, moreover health sector reform/changes^[11]. Education is oftentimes the key to any role of progression^[12].

This a survey study aimed to evidence the role that some of DRTSs play in image interpretation in Kingdom of Saudi Arabia (KSA). The objective was to display the range of advanced activities undertaken by DRTSs through a designed data collection sheet and use these to quantify and display their contribution.

METHOD

A cross-sectional and a quantitative study was conducted based on a selective survey to provide a deep insight into the issue of image reporting by Sudanese DRTSs whom working outside the country. Even though, the controversy about response bias that has a significant effect^[13,14] or hasn't^[15,16,17,18] on research results, questionnaire was designed simply and clearly. Also clearly defined target population determined to mitigate or avoid biasing as possible, in order to conduct sound study. Online survey to group of SRTSs working outside the country particularly in KSA. Survey Monkey was used to create the questionnaire, which put online for special close Facebook page of Sudanese DRTSs^[19] to the target group in August 2016 with a response period of 30 days to give a chance for those so busiest to writes about their a unique experiment to run through this a big challenge faces RTSs in the Arab World. Moreover, survey link has been send via an available emails to ensure that reached for the largest numbers of the target group.

Although, the survey focussed on the radiographic image reporting, both open and closed questions were design to reflect the broader nature of current Sudanese DRTSs who they have written or writing images report. The survey was made as a result of responses feedback. Participant data was entered in Excel and summary descriptive statistics were generated using IBM-SPSS 16.0. Statistical tests used included chi-square and Pearson's correlation. This study of current practice was considered to represent service evaluation and therefore no ethical approval was required.

The main purpose of this research was to explore the different experiments among those whom got a license to write images reporting for X-ray in KSA. In addition to the basic information of the participants in KSA such as type of gender and qualification, their working area (WA) was divided according to geographical directions to: Middle (Capital area); Western; Southern; Northern; Eastern.

Questionnaire for the participants working in KSA ,sought to explore through open-ended questions the following: Estimation the reports number (RN) which they written? Determination the overall total of reports per year (R/Y)? Calculation the RN for chest X-ray

(CxR), upper/ lower extremities (U/LE), skull/spine and abdomen (Abd).

Two closed questions were designed to know if the participants: have written any wrong report (WR) before? This question required answer with yes or no. Have got the ability to succeed on image reporting by did extra personal efforts to improve their knowledge or the curriculum is quite enough to let them to doing that?

RESULTS

Results revealed a response rate of 67.65% was male ($n = 23/34$) and 32.35% female ($n = 11/34$) (Figure 1).

Out of the total subjects who participated in this study, 20(58.8%) were BSc holder, 12(35.3%) have MSc and 2(5.9%) PhD holders (Table 1). It is noticeable that more than fifty percent of the participants have BSc, because BSc is the one basic requirements of ministry of health in KSA to give license for medical center (MC) to practice^[20]. For this reason survey showed that the majority vast of respondents are working in medical centers 88.6%($n = 31/34$) (Figure 2).

Pearson test showed that qualification has a significant correlation with WA, experience and RN p -value < 0.05. Answers were gathered from different areas in KSA, half of them working in the middle17(50%), 8(24%) in southern, 4(12%) in western, 3(8%) in northern, 1(3%) in eastern and just1(3%) skipped this question.

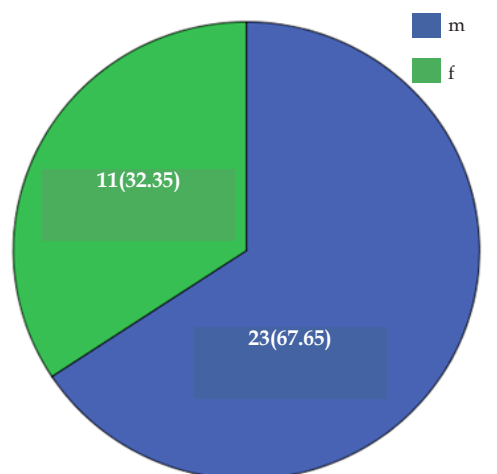


Figure 1 Gender of participants (m=male and f = female).

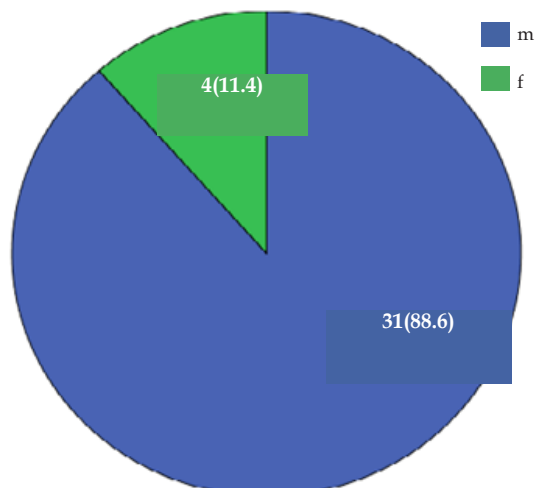


Figure 2 Distribution of participants in working between hospital and MC.

Respondents have several years of experience in image reporting ranged ≤ 2 (29.41%), (2-5) (35.3%) and > 5 (35.3%). Respondents were asked to demonstrate how they got the ability to succeed on this task. Majority of them ($n = 24/34$; 70.59%) did extra personal efforts and ($n = 10/34$; 29.41%) believes that the curriculum is quite enough. Also Pearson test detected a significant correlation of experience with qualification and WR (p -value < 0.05) as well RN p -value < 0.01 . However, non-significant with WA (Table 1). Again Chi-Square test confirmed the significant of qualification, WA and add others an important significant such as workplace and the personal efforts which give the participant ability to succeed on writing images report (p -value = 0.001, 0.000, 0.000 and 0.016) respectively Table 2.

There was variations of RN done by the respondents till they answered the questionnaire ranged from (500-1000), (1000-3000) and more than 5000 these have equal percent (32%) for each one, while the less ranged (3000-5000) 4% (Table 1). As qualification RN has a significant relation with experience by using Pearson correlation (p -value < 0.05 and appeared another significant correlation with qualification < 0.01 . From the obtained data, it was also showed that more than half of the respondents (53%) didn't wrote any WR before. In contrast, 47% confessed that they had wrote WR, this was revealed a significant correlation with just experience p -value < 0.05 . WR has non-significant to qualification, WA and RN (Table 1).

Moreover, study explored that participants wrote radiographic reports for different body parts. CxR represented the highest reports ≥ 500 (32%), 24% of each (250-499) and ≤ 250 while, 20% of them skipped this question. Other body parts such as Abd ≥ 250 (24%),

(100-249) 18%, ≤ 100 (32%) and 26% skipped question. RN for skull and spine ≥ 400 (18%), (100-399) 15%, ≤ 100 (41%) and 26 skipped. U/LE reported ≥ 300 (20), (100-299) 19%, ≤ 100 (41) and 20 skipped the question. Also Pearson test demonstrated a significant correlations through these body parts p -value < 0.01 (Table 3). Chi-Square test reported $df = 3$ for each written body parts and Asymp. Sig = 0.787, 0.185, 0.124 and 0.675 for CxR, U/LE, skull / spine and Abd respectively Table 3.

DISCUSSION

This study explores that Sudanese DRSs have the ability to writing radiographic images reporting in the Arab World. Importantly while, the authorization to enable RT to do this task still doesn't found in the Middle East countries, there has been flicker of hope in KSA generally regarding to the radiographic image reporting by DRTSs whom have different qualifications and experiences. Result of this study more similar to recent a longitudinal analysis study in UK by B. Snaith *et al*^[21]. where showed an important role of radiographers in writing reports^[20]. In KSA males more than females this may be due to the preference of a large numbers of males to work abroad. Those being working in several areas in KSA, the concentration in the most populous areas and thus more medical centers particularly screening centers of expats^[20].

Globally, great efforts have been made and are being made to achieve the ambitions of radiographer professionals. WHO - Pacific Regional begun by supporting workshop on image interpretation for

Table 1 Correlations.

Category	Variable	N	Percentage %	Correlation with					
				Q		WA	Exp	RN	WR
Qualification (Q)	BSc	20	58.8	PC	1	0.334*	0.348*	0.341*	-0.158
	MSc	12	35.3	P - value	-	0.027	0.022	0.024	0.187
	PhD	2	5.9						
Total		34	100	N 34					
Working Area (WA)	Middle	17	50	PC	0.334*	1	-0.006	0.099	-0.224
	Western	4	12	P - value	0.027	-	0.486	0.289	0.101
	Southern	8	24						
	Northern	3	8						
	Eastern	1	3						
	Skipped	1	3						
Total		34	100	N 34					
Experience (Exp)	≤ 2 year	10	29.41	PC	0.348*	-0.006	1	0.573**	-0.372*
	(2 - 5) years	12	35.3	P - value	0.022	0.486	-	0	0.015
	> 5 years	12	35.3						
Total		34	100	N 34					
Reports Number (RN)	500-1000	11	32	PC	0.341*	0.099	0.573**	1	-0.256
	1000-3000	11	32						
	3000-5000	1	4	P - value	0.024	0.289	0	-	0.072
	More than 5000	11	32						
Total		34	100	N 34					
Wrong Report (WR)	Yes	16	47	PC	-0.158	-0.224	-0.372*	-0.256	1
	No	18	53	P - value	0.187	0.101	0.015	0.072	-
Total		34	100	N 34					
Ability to succeed on image reporting	Frequency			Percent					
Extra personal efforts	24			70.59					
Curriculum is quite enough	10			29.41					
Total	34			100					

R/Y. High ≥ 2001 , Medium (1001 -2000) and low ≤ 1000 ; *. Correlation is significant at the 0.05 level (1-tailed); **. Correlation is significant at the 0.01 level (1-tailed); PC = Pearson Correlation.

Table 2 Test Statistics.

	Gender	Q	WA	Workplace	Exp	RN	R/Y	WR	Ability to succeed
Chi-Square	4.235 ^a	14.353 ^b	33.059 ^c	19.882 ^a	0.235 ^b	8.824 ^d	6.941 ^d	0.118 ^a	5.765 ^a
Df	1	2	5	1	2	3	3	1	1
Asymp. Sig.	0.04	0.001	0	0	0.889	0.032	0.074	0.732	0.016

- a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.0.
- b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.3.
- c. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 5.7.
- d. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.5.

Table 3 PC - Radiographic Reports number of body parts.

Category	Variable	N	Percentage %	Correlation with				
				CxR		U/LE	Skull	Abd
CxR	High	11	32	PC	1	0.839**	0.722**	0.590**
	Medium	8	24	P - value	-	0	0	0
	Low	8	24					
	Skipped	7	20					
Total		34	100	N 34				
U/LE	High	7	20	PC	0.839**	1	0.775**	0.566**
	Medium	6	19	P - value	0	-	0	0
	Low	14	41					
	Skipped	7	20					
Total		34	100	N 34				
Skull/ Spine	High	6	18	PC	0.722**	0.775**	1	0.666**
	Medium	5	15	P - value	0	0	-	0
	Low	14	41					
	Skipped	9	26					
Total		34	100	N 34				
Abd	High	8	24	PC	0.590**	0.566**	0.666**	1
	Medium	6	18	P - value	0	0	0	-
	Low	11	32					
	Skipped	9	26					
Total		34	100	N 34				

** Correlation is significant at the 0.01 level (2-tailed); CxR. High ≥ 500 , Medium (250 - 499) and low ≤ 250; U/LE. High ≥ 300 , Medium (100 - 299) and low ≤ 100; Skull/ Spine. High ≥ 400, Medium (100- 399) and low ≤ 100; Abd. High ≥ 250, Medium (100- 249) and low ≤ 100.

Table 4 Chi-Square test.

	Chest	U/LE	Skull/spine	Abd
Chi-Square	1.059 ^a	4.824 ^a	5.765 ^a	1.529 ^a
Df	3	3	3	3
Asymp. Sig.	0.787	0.185	0.124	0.675

- a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.5.

radiographers held in Fiji^[22]. Also UK has different study courses provided by educational foundations offering radiographer reporting programmes^[23]. The President of Australian institute of radiography has expressive message issued in a press release entitled role boundaries in radiography “the patient’s experience and outcomes is their central focus, all parties involved need to work together to develop plans which would deliver optimal quality healthcare that Australians require and expect”^[24].

Present study clarifies the disparity number of plain radiographic images reports done by DRTSs, with almost more than 5000. CxR the most commonly performed in this study and this similar to study of B. Snaith *et al*^[21].

Even though more than half of the respondents confirm didn’t wrote any WR before, some participants expressed their reservations to write about this topic. UK studies confirmed radiographer’s report has accuracy, quality and remains equivalent to a consultant radiologist especially plain radiographs^[25,26].

Although RT participated on this study worked very hard individually, Arab World didn’t has a recognized study program to implemented this advance role in wide area till now. This is probably led the vast majority of the participants (70.59%) to depend on their extra personal efforts in reading, so they increased and improved their knowledge to have the ability in doing this task. Worth noting recently, in KSA anecdotal evidence this role has been stopped for any new RT except for holder MSc as a minimum qualification. This experiment of SDRTSs deserves to studying and developing rather than stopped it. To sustain this vital role it’s necessary to create professional programmes and take benefits from them as in developed countries. Especially, the acceptance in such programs in Western universities for the international students (definitely this include Arab countries) is very difficult and limited. Engaging DRTS in reporting workload, would give a great opportunity to radiologists to undertake more complex work^[27,28].

Study limitations

Small sample of the respondents and referring physicians did not include to get accurate evaluation to performance of the participants.

CONCLUSION

DRTSs have a quite challenge to image interpretation in the

Middle East. Even though radiographer in developed countries got this authorization more earlier^[3,4,5,26,29,30,31,32]. In UK the quality of radiographer reporting is similar to a consultant radiologist regardless the area of clinical practice^[26,33,34]. In fact that, any one of the RT who participated in this survey has a unique experience and skilful so is consider an important reference should take a benefit from. This study explores the significant and value task that DRTSS are making in KSA. This experiment should be evaluated to see to what extent can expand it on the wide scale in Arab World to improve health care services. For further efforts, initiatives, workshops or studies are required sustainability of image reporting by DRTSS in Arab World.

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