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Brief report

THE RADIOLOGIST WORKLOAD INCREASE; WHERE IS THE LIMIT?: MINI REVIEW AND CASE STUDY

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SUMMARY

Introduction: *Radiologist workload had increased significantly within the past three decades. In 2006-2007, the average annual workload per FTE radiologist was 14,900 procedures, an increase of 7% since 2002-2003 and 34.0% since 1991-1992. Annual RVUs per FTE radiologist were 10 200, an increase of 10% since 2002-2003 and 70.3% since 1991-1992.*

Subjects and methods: *The study included worksheets data of three radiology specialists in their first three years as specialists. Data were collected and analyzed retrospectively for the period frame January 1st to September 21st 2018. The total data of imaging procedures by one radiologist had been collected and then separated by different imaging procedures as followed.*

Results: *Average total number of imaging procedures per radiologist was 2785. Separately, there were: 850 bone X ray images, 550 chest X rays, 250 ultrasound examinations, 860 CTs and 256 MRIs. Daily average of analyzed imaging procedures per radiologist was as followed: 7,4 bone X ray images, 4,8 chest X rays, 2,2 ultrasounds, 7,5 CTs and 2,2 MRIs. Total working time per radiologist in the analyzed time period was 684 hours. Average time spent for analyzing per one imaging procedure was 14 minutes and 45 seconds spread in total 114 working days.*

Conclusions: *The conclusion is that current workload for a radiology specialist obviously represents a necessity to be thoroughly explored. This case study and previous literature results indicate that a well constructed large scale study represents a potential in resolving the previous studies limitations and providing relevant data, so correct measures and guidelines could be developed.*

Key words: *radiology – workload - relative value units*

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INTRODUCTION

Radiologist workload had increased significantly within the past three decades. In 2006-2007, the average annual workload per FTE radiologist was 14,900 procedures, an increase of 7% since 2002-2003 and 34.0% since 1991-1992. Annual RVUs per FTE radiologist were 10 200, an increase of 10% since 2002-2003 and 70.3% since 1991-1992 (Bhargavan et al. 2009). But, through the past decades, there was no significant increase in the number of radiology specialist. In 2014 there was an average of 12 radiologists per 100 000 population in Western Europe. It was averaging from the lowest as 3 in Italy to the highest as 31 in Greece (Royal College of Radiologists 2014). Also, studies in the UK had shown ageing and possible reduction in the number of available radiology specialists by the year 2030 (Piorkowska et al. 2017).

SUBJECTS AND METHODS

The study included worksheets data of three radiology specialists in their first three years as specialists. Data were collected and analyzed retrospectively for the period frame January 1st to September 21st 2018. The total data of imaging procedures by one radiologist had been collected and then separated by different imaging procedures as followed: bone X ray imaging, chest X ray imaging, ultrasound imaging (US), computed tomography (CT) and magnetic resonance imaging (MRI). Also, we have calculated the working hours, average daily workload and time available for analyzing per one radiological imaging procedure.

RESULTS

Average total number of imaging procedures per radiologist was 2785. Separately, there were: 850 bone X ray images, 550 chest X rays, 250 ultrasound examinations, 860 CTs and 256 MRIs. Daily average of analyzed imaging procedures per radiologist was as followed: 7,4 bone X ray images, 4,8 chest X rays, 2,2 ultrasounds, 7,5 CTs and 2,2 MRIs. Total working time per radiologist in the analyzed time period was 684 hours. Average time spent for analyzing per one imaging procedure was 14 minutes and 45 seconds spread in total 114 working days.

DISCUSSION

Taking in mind, as radiologist workload had increased significantly within the past three decades and there was no significant increase of the number of radiology specialist the workload, or better said

overload with work had become a burden and important issue to attend and resolve (Bhargavan et al. 2009).

Previous studies had shown the increase of workload, shortening of the time available for analyzing image material and consenquently an increased pressure on radiology specialists around the world (Royal College of Radiologists, 2014, Piorkowska et al. 2017, Sokolovskaya et al. 2015).

Studies on radiology workload use the analysis of relative value units since 1991, and showed early that can serve as a model for making workload comparisons among specialties (Conoley & Vernon 1991). As shown in previous studies there was a steady rise in radiologists NDI workload (as reflected in RVU rates) between 2000 and 2006 in the hospital outpatient, hospital inpatient, and private office settings (Levin et al. 2013). This clearly corroborates the earlier observation that during those years, imaging was the most rapidly growing of all physician services. But between 2006 and 2011, aside from minor fluctuations, there was essentially no further growth in radiologists workload. Emergency departments were the only settings where workload continued to increase. Over the entire study period from 2000 to 2011, the data indicate that the absolute increase in NDI work among radiologists (as measured by RVU rates) was greatest in hospital outpatient facilities (289 per 1,000 Medicare beneficiaries). Emergency departments and office absolute increases were lower (218 and 194, respectively). Inpatient absolute growth was lowest at 99 (Levin et al. 2013).

In our pilot retrospective study, we have analyzed the workload of three radiology specialists in their first three years as specialists. Considering previously published data as being similar to our study, it is to conclude that average workload and short time for analyzing the imaging material is potentially representing a danger in significant misinterpretation of imaging materials (Piorkowska et al. 2017, Sokolovskaya et al. 2015).

Considering the research of Levine et al, there is more and more concern on emergency department increase for the past decade (Levine et al. 2013). The increase in the emergency department radiologist"s RVU is a potential pitfall for the increase in misinterpretation of imaging materials, having in mind emergency departments are stresfull in the first place.

Emergency radiology studies during on-call hours may be particularly prone to diagnostic error due to relative staff shortage and absence of subspecialty trained attending radiologists. In addition, long shifts and high workloads are considered stressful, have negative health effects and can lead to burnout among radiologists (Harolds et al. 2016, Mohammed et al. 2019).

Limitations of our and other previously conducted studies are mainly concerning on small number of included radiology specialists (Sokolovskaya et al. 2015).

Reccomendations for future studies are conducting a large scale study on a national level,as it will consequently provide valuable insight in this important issue. This future study should include the analysis in different aspects, such as: life quality assesment, stress levels in different positions in radiology, assesment of inpatients, outpatiensts and emergency patients RVUs and comparison to other specialties.

CONCLUSIONS

The conclusion is that current workload for a radiology specialist obviously represents a necessity to be thoroughly explored. This case study and previous literature results indicate that a well constructed large scale study represents a potential in resolving the previous studies limitations and providing relevant data, so correct measures and guidelines could be developed.

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Contribution of individual authors:

Vedran Markotić: Design of the study, literature search, data collection and processing, literature data analyses;

Tina Pojužina: Design of the study, literature search, data collection and processing, literature data analyses;

Dorijan Radančević: Design of the study, literature search, literature data analyses;

Miro Miljko: Design of the study, literature search, literature data analyses.

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