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Workload in Radiology

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Modern times promised humankind a great hope to lower the workload in every aspect of life. However, the story progressed entirely in a different way, and many professionals bemoan their jobs and lives due to increasing workloads. The workload of radiologists at least has been increasing for many years after the technology boom that started in the 1960s. The increasing and ageing world population, high demand for high quality healthcare and the practice of new medicine mostly depending on the techno-diagnosis have been the major factors in the workload increase. Health policies encouraging the commoditisation and privatisation of healthcare are enforcing this course. This article aims to elaborate on the increasing workload in radiology, and deals with the issues related to this problem, including costing and quality.

Calculating Workload

Firstly workload should be defined, as there is confusion about the definition. In daily practice the understanding of workload is simple, and the amount of work done in a certain amount of time has been accepted as the workload of an individual. In radiology the crude number of examinations performed in a unit time has been used as the measure of the workload for many years. In small scale departments and single businesses it can be meaningful to an extent where it does not work in complex and sophisticated organizations. Relative value scales have been developed to allow comparison of different studies on the basis of time expended, complexity of the examination or both. The degree of sophistication of these tables varies, and many of them separate the technical from the professional time-based components of a radiological procedure. Unfortunately, most of these scales have b een d eveloped f or r eimbursement processes. Non-reporting activities that are necessary for the quality of the process have not been taken into consideration in most current practices.

Factors Affecting Workload

Workload and quality in radiology is affected by both intrinsic and extrinsic factors. T he n umber o f r adiologists that share the workload, the amount of hours a radiologist works per day or week, the number of exams reported per day, the combination of the exams that have to be reported in a certain amount of time, the methods used for displaying the images, dictation and typing methods and the type of non-reporting duties are the intrinsic factors that directly af fect the workload and its calculation.

In the real world there are several types of radiologists. Most of our colleagues work as a consultant radiologist in daily practice, or in academic positions, and none of them is identical. The type of work done and the configuration and complexity of responsibilities are totally different in different institutions and not factored into a common workload calculation. System- or organ-based work sharing has been becoming the choice of organisation in many departments. However the number of departments where the work share is planned according to the modalities is not so low, and this pragmatic approach is believed to increase the productivity.

The amount of time spent on each type of duty or task and the operating hours are also not standard and differ from country to country. In terms of working h ours, n ational l aws m ake for little discrepancies among the countries. T he E uropean s tandard i s 40 hours per week. In Turkey

the law limits the working time of radiologists to 35 hours/per week. However in practice most of us work over these limits. Soni and colleagues found that an American radiologist works 49.3 hours weekly. However, independent radiologists working alone may work up to 50.3 hours while a private radiologist works on average 50.4 hours per week (Soni et al. 2010).

The number of examinations, which is the most used parameter in calculation, dominates the workload related problems. The increase in radiological examinations since the 1970s is obvious. Bhargavan et al. found that the number of procedures in the US increased by seven fold between 2003 and 2007 (Bhargavan et al. 2005). They also found that radiologists' work increased by ten percent during that period. The procedures per full time equivalent (FTE) radiologist per year increased to 14,900 in 2007 from 13,950 in 2003 (Bhargavan et al. 2005). The increase rate of annual relative value units (RVUs) per FTE radiologist was parallel to the procedures. The trend had not changed since 1991. An international comparison gave the CT/MRI procedures per radiologist in different countries, with the average at 1440 but the deviation extremely high between nations (Nakajima et al. 2008). Japanese radiologists seemed to be the busiest of all the world's radiologists.

According to the findings of other research, which gives the growth change of each modality, between the years 2000-2005, brain MR imaging doubled while X-ray examinations fell (Miller 2005). This means that not only the number of procedures but the complexity and difficulty of imaging have increased gradually.

On the other hand the staffing to undertake this increased amount of work has not been stepped up accordingly. What is more, the distribution of radiologists i n different countries varies starkly. For example, the EU average is 110 radiologists per million population. Greece comes top with 228, while Japan has the lowest distribution in the world with 40 radiologists per million population (OECD, 2007).

The workflow and the methods used for displaying the images, dictation and typing opportunities determine the time spent for each examination. Information systems, PACS and voice recognition systems have several effects on the individual workloads. In several articles that evaluate the effects of PACS on the workload the authors conclude that the transition to filmless operations was associated with increases in inpatient and outpatient use of radiological services. Evidence varies with regard to impact on reporting time, however. A number of the articles claim that PACS systems improve reporting times and productivity (Lepanto et al. 2006; Srinivason et al. 2006). As a PACS user for twelve years, in my experience PACS disciplines the workflow, increases productivity and reporting quality and enhances educational motivation. However, I have not observed any positive effect of PACS that lowers the workload of the department. Dictation method has been the focus of a few research articles. In these studies speech recognition systems were found to be time consuming, as they increased individual time expenditure foreporting by 30 percent (Gale et al. 2001; Langer 2002).

Non-reporting duties have been accepted to be an important part of a radiologist's daily workload in recent years. A radiologist is not only responsible for reporting an examination, but also takes care of the appropriateness of the exam, deals with the clinical and lab data and is responsible for the patient medication and preparation. He or she prepares protocols and sets out the examination method when it is needed. After reporting, the radiologist explains and discusses the results with the patient and his or her colleagues. H e o r s he p erforms these duties mostly in between the reporting activities. Depending on the department's organisation, a radiologist takes several other responsibilities such as a quality manager, administrative staff or advisor, educator, researcher, technical or scientific consultant, supervisor or expert. These intrinsic factors directly affect the workload and its calculation.

Some of the most important extrinsic factors that affect the workload in radiology are the increasing role of imaging for screening and follow-up, imaging as part of the physical examination, clinical utilisation of radiology to avoid malpractice issues, widespread use of teleradiology and health policies.

Imaging for screening and follow-up has increased the number of examinations in medical practice. Diagnostic and treatment guidelines have also contributed to heavier workloads. Compounding these factors, changing healt h policies, which promote imaging as a means to curb long-term medical costs across the population, have been accompanied by falling reimbursement for imaging in tandem with a move towards privatisation.

One of the most important challenges today is the increasing and ageing world population. The proportion of people over 80 will increase rapidly after 2020 according to many research papers (United Nations, 2010; P alacios 2 002). A n a geing and increasing population demands high quality healthcare systems. In the context of limited finances and staffing, classical medicine has consequently become a technologydependent business. Radiology has many challenges to overcome, in part due to economic and cultural globalisation, and because of the increasing complexity of the specialty with evolving technology. A Medicare report given to the USA congress in 2011 revealed that the volume of physician services per beneficiary grew between 20 0 0-20 09 (Medicare Payment Advisory Commission 2011). Imaging was the highest of all due to diagnostic tests. Payment policies slowed this to an extent. However, it is still the main cost to the health system.

Due to its easy accessibility, high sensitivity and specificity, radiological imaging has replaced the physical examination such as abdominal palpation for liver and spleen enlargement. Too little time is spent on physical examination of a patient with intervertebral disc hernia. Imaging also has been used as a tool of protection from malpractice.

Health Policy

Health policies have direct influences on w orkloads. T he e conomy h as been steering processes, and many countries have been changing their

health systems with reference to the new global economy, which forces a dropping in reimbursement rates. Turkey is an interesting example of the boom in radiological examinations as a result of a healthcare system transformation. The targets of this change were to increase access to the system, to centralise the insurance bodies, to achieve total coverage of the population and to promote private health services. F amily m edicine h as b een encouraged. And the payment has been done according to the performance of the physicians. The result was amazing, and the level of procedures overtook the OECD mean in a couple of years. For example, the number of MRI scans per thousand patients was 41 before the transition. It jumped up to 76.5 compared to the European average of 46.4 by 2010. The most striking result was that overall the prices of examinations dropped to a unbelievable level where a brain MRI scan was priced at 15 Euros (which was about 45 Euro before) by private service providers almost in every state hospital.

Teleradiology brings with it new challenges. Centres using teleradiology to compensate for the shortage in radiologist numbers may see workload lessen. However, for the centres on the receiving end, working hours will be expanded.

Whatever the factor is, across the world radiologists in general came across with a heavy workload in the last d ecades. I n a p aper c oncerning burnout and satisfaction of U.S. physicians, radiologists were ranked ninth among specialists, their score being above the mean value. More than 50 percent of the radiologists questioned declared that they experienced burnout due to responsibilities and workload (Shanafelt et al. 2012).

In order to compensate for increasing workload, people have to work rapidly. Heavier workloads not only encourage the use of speed, but the fatigue of a heavier workload itself might blunt perceptive skills even if appropriate time is used per case. This has been evaluated in detail in an article by Jasinski (Jasinski 2004). However, the reality of “speed promotes mistakes” is neither a standard nor a reference in lawsuits. On the other hand, radiology societies recommend 16-22 thousand procedures per full time equivalent (Royal College of Radiologists 2012).

Conclusion

Discussing t he w orkload m erely w ith the use of crude study numbers will not reflect the real workload. If an optimum workload could be designed, its components of time, money and quality would have to be taken into consideration (Brady 2011; Sunshine and Burkhardt 2000). To keep the workload and quality constant you have to limit the number of procedures and share the rest of the work. Efforts to control imaging demand and efficient use of teleradiology may play a role in reduction of future workload. Guidelines, if utilised properly, will help to control the overuse of imaging modalities. I n addition a new t ype of radiological worker may emerge: radiographers may be educated to interpret x-rays or ultrasonographers’ sole remit may be responsibility for all ultrasound exams. However new imaging techniques and technology would inevitably multiply the workload.

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