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A Systematic Review for Evaluating the Effects of Teleradiology

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Abstract

Background:The use of telemedicine has received considerable attention in recent decades and it has partaken different applications such as teleradiology, telepathology, remote surgery, and so on. Telemedicine has been an approach with broad publications and a technology adopted by broad categories of healthcare users. The use of new technologies at each stage of teleradiology creates new challenges. Like any system, the lifecycle of the system development from production to maintenance requires actions to take.

Methods: Based on the PRISMA checklist, a robust search strategy was developed to identify all available studies meeting the inclusion and exclusion criteria. A literature search was conducted in March 2018 for a week for searching in PubMed/MEDLINE, Scopus, and Web of Science. We excluded articles published before 2000, non-English articles, all kinds of reviews, conference papers without full texts, notes and news, books, letters to editors, gray literature, authors' opinion, educational materials, and ad hoc implementation in the technical scope. All full-text literature in English concerning the assessment, evaluation, patient outcome, economics, and managerial aspects with a local or wide implementation in the form of original articles and case studies were included in this review. Then, data were imported into an Excel file.

Results: The articles were published between January 2000 and October 2018. A full, deep review revealed that most articles were related to the hospital environment. The financial evaluations comprised cost-effectiveness, cost prediction, initial cost reduction, and plummeting transporta-

tion and referrals of hospitals all over the world. The comparative evaluation studies usually compared and reviewed the type of pictures sent, the type of image formats, and the various tools for viewing the images in the hospitals. Therefore, the researchers decided to focus on the following themes: economic evaluation, technical evaluation of the system, evaluation of the PACS/RIS system, comparison of teleradiology and non-teleradiology systems, comparison of different instruments used in radiology systems, and the impact of these systems. Themes that were extracted in this article are as follow: comparison of methods or instruments, economic evaluation, technical evaluation, radiology information system (RIS) or picture archiving and communication system (PACS), and teleradiology impacts on hospital settings. With regard to the comparison of methods or instruments, articles compared two methods of teleradiology and non-teleradiology. In some papers, the authors examined various data entry tools and methods of compression. The reviewed articles indicated the impact of RIS or PACS on different aspects, such as workflow, efficiency, and effectiveness. Some articles aimed to evaluate economic, cost-effectiveness, cost-benefit, or any other cost estimation of the application of RIS or PACS.

Conclusion: In this paper, based on reviewing the context of existing literature, only were one or two of these dimensions discussed due to fewer articles published in relation to the broad aspect of teleradiology. In order to have a comprehensive view concerning the effect of radiological systems, it seems that we have to wait until various papers discuss different aspects of radiological systems and their impacts on economic or performance improvement.

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Cobb Angle Measurement Decision Support System of Radiography Images in Patients with Idiopathic Scoliosis

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