RESEARCH ARTICLE

Developing an Appropriateness Criteria for Knee MRI Using the Rand Appropriateness Method (RAM)-2013

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Abstract

Background: Knee pain is one of the most common reasons patients visit their physician. In this regard Magnetic Resonance Imaging (MRI) is the tool of preference for diagnosis. The aim of this study was to determine appropriate guidelines for knee MRI administration using the RAND Appropriateness Method (RAM)-2013

Methods: This qualitative study was done in the Mashhad University of Medical Sciences in 2013. The most appropriate approved knee MRI administration clinical guidelines were evaluated using Guidelines Evaluation and Research Appraisal (AGREE). Panel members consisting of six orthopedic and three rheumatologic doctors gave scores ranging from 1 to 9 for each scenario. The indications were grouped as appropriate, equivocal and inappropriate. Data were analyzed by descriptive statistics and SPSS ver. 18 software.

Results: Sixty-three scenarios were extracted from the guidelines and then the scenarios were evaluated in 26 indications. Thirty-two (50.79%) cases were considered appropriate, 12 (19.04%) cases uncertain and 19 (30.1%) cases inappropriate.

Conclusions: The RAND appropriateness method is helpful in identifying the opinion of stakeholders in health care systems. Moreover, making practical use of clinical guidelines can improve patients' quality of care and prevent unnecessary costs.

Key words: Guideline, Knee joint, MRI, RAND Appropriateness Method

Introduction

The knee joint is the most important weight bearing joint in the human body that is exposed to high mechanical pressure during all forms of activities such as standing, walking and even sitting, and this is due to weight, load bearing and being in a fixed position. Hence, the knee joint is commonly affected by intra- and periarticular disorders. In developing countries, such as Iran, knee injuries are very common due to the high use of motor vehicles and the increase of various sports participation without using suitable and sufficient preventive measures. These injuries can cause many problems; therefore, the correct diagnosis before any aggressive treatment is helpful in improving the final result (1).

Radiological diagnoses have helped physicians to make early diagnosis and prevent unnecessary invasive procedures. However, medical imaging costs have increased globally and this may be due to its overuse. Among all medical imaging technologies, MRI is the most prominent and its use is predicted to increase (2-6).

In a study conducted by Lehnert and Bree, 74% of administrated CT and MRIs were reported as appropriate and 26% as inappropriate. Inappropriate imaging included MRI of the knee, back and shoulder (7). In evaluating the clinical appropriateness of an administrated MRI of the lumbar spine with the RAND appropriateness method, inappropriate, uncertain and appropriate administration was 56%, 24% and 20% respectfully. The economic costs of inappropriate administration were also calculated to be 88,009,000 rial (around $30,000 US) (8). Therefore, concern over

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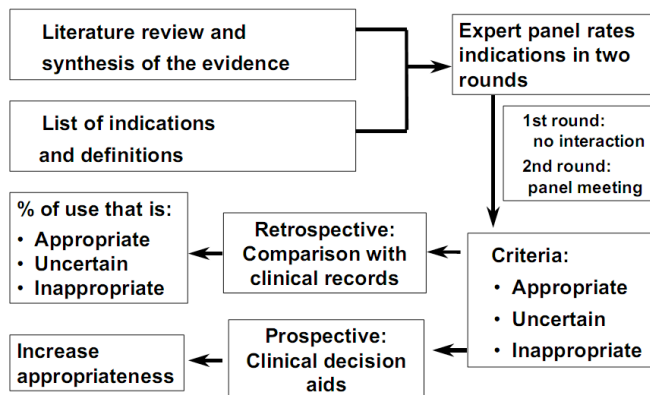
Figure 1. The RAND/UCLA Appropriateness Method.

MRI prescription appropriateness has increased. Unnecessary MRI administration has a substantial financial burden for insurance companies and patients; thus, the need for an analytical tool to improve physicians' prescription ability is needed (7).

The RAND Appropriateness Method (RAM) helps developing appropriate guidelines based on available evidence and expert opinions. This method was designed by the RAND Institute and the University of California at Los Angles and it has been used in many North American and European studies. RAM includes criteria or clinical scenarios (9). The steps of the RAM process is shown in Figure 1.

Evidence based performance has been proposed globally for some time, among which the Clinical Guidelines (CGs) is considered the best tool to apply evidences in clinical decisions. CGs transfers the available evidence into practical suggestions to help service providers (physicians) in clinical decision making (10). Clinical guidelines are systematically collected from the latest and most reliable scientific evidences that show classified ways of dealing with a patient with regard to priorities, effectiveness and cost-effectiveness.

In developing countries, there is an ongoing discussion about the fact that valid local evidences are limited and if the evidences from developed countries are going to be used, is there any need for duplication? In response to this question, the topic of guideline adoption has been introduced. Guideline adoption is a systematic view to available guidelines to find the most relevant one for our patients and then to combine it with cultural and regional requirements and available facilities of the local healthcare systems (11). RAM is used in many studies, especially to develop appropriate guidelines in surgical care as a research method (9, 12, 13). Since knee pain is one of the most common complains causing patients to visit the doctor and considering the fact that there has not been any study in Iran to evaluate knee MRI indications, this study was conducted with the aim of determining appropriate guidelines for knee MRI administration using RAM (14).

Materials and Methods
This qualitative study was performed to determine the appropriateness of knee MRI administration on RAM.

The RAM steps are as follows:
1. Select reliable and suitable guides:
   The available clinical guidelines related to knee MRI were found in the most related data bases and web sites. The search key words included: indication for knee MRI, MRI indication for knee, knee MRI guidelines, and guideline for prescribing knee MRI. The list of evaluated data bases from 2000 to 2013 is as follow: NICE, SBU, SIGN, PHAC_ASPC, HTA, AIHW, WHO, EMRO.WHO, G_N, NZGG, AHRQ, GUIDELINE, NCCN, FDA, FMH, IQWIG, ASCO, NIH, CDC, THECOCHRANELIBRARY, HAS-SANTE, and SANT.
   We found nine guidelines that were assessed by two experts (a rheumatologist and an orthopedic physician) and from these, five of them were selected (9). Our panel of experts consisted of nine, and they evaluated these five guidelines using a translated and validated version of the Appraisal of Guidelines for Research & Evaluation (AGREE) while taking into consideration Iran's healthcare system (15). Each item in AGREE give scores as follows: strongly disagree, disagree, agree, and strongly agree, from 1 to 4 respectfully. Two guidelines were selected as the most appropriate scientific resource, for knee MRI indication based on the sum of these scores.
2. Selecting the panel of experts:
   According to the RAND method, panel members should consist of at least nine experts, so six orthopedic physicians and three rheumatologists were selected because these experts are more involved in prescribing knee MRIs and their area of expertise is more relevant to guideline assessment (9).
3. Extraction indicators and scenarios:
   Two selected guidelines for knee MRI indication were: the 2010 American College of Radiology (ACR) and the 2008 NHS Clinical Effectiveness Forum (16, 17). Finally clinical scenarios were defined based on accredited clinical guidelines and expert opinions.
4. Expert panel
   The extracted scenarios from the two selected guidelines along with the scoring tool, designed by a researcher, were submitted to the experts for scoring. The researcher visited panel members separately in their work office, explained the scoring method and asked them to score scenarios based on their experience and knowledge. Each scenario had received a score from 1 to 9 (1 means that MRI administration is quite inappropriate, 5 means uncertain and 9 means appropriate).
5. Step of analyzing panel scores
Based on appropriateness scores the scenarios were divided into three groups:
Appropriate: scenarios with a mean score of 7-9 with the panel members having a majority consensus.
Uncertain: scenarios with a mean score of 4-6 that did not reach consensus agreement.
Inappropriate: scenarios with a mean score of 1-3 with total panel agreement (9).
The study was approved by Research Committee of the

Table 1. Appropriateness of MRI administration scenarios		
Appropriateness	Frequency	Percent
Appropriate	32	50.7
Uncertain	12	19.04
Inappropriate	19	30.1

Mashhad University of Medical Sciences and the collected data were analyzed using descriptive statistics and SPSS ver.18 (SPSS Inc., Chicago, IL).

Results

According to RAM, in order to score the evidence, at first we conducted a meticulous literature review to find the latest available scientific evidence. The most important and related medical electronic data banks and accredited and governmental web sites were searched and nine clinical guidelines related to knee MRI were found. In the next step, based on the opinion of the expert panel head and one of the members, five clinical guidelines were chosen. Then all the panel members evaluated these five clinical guidelines based on the validated translated version of the AGREE clinical guideline evaluation tool. Based on AGREE two guidelines belonging to the American College of Radiology (ACR) and NHS Clinical Effectiveness Forum were selected (16, 17).

MRI indications of two clinical guidelines along with panel opinions for MRI administration were combined. Out of the selected guidelines 63 scenarios for knee MRI were extracted. Scenarios were evaluated in 26 indications. The scenarios' appropriateness is presented in Table 1 and several samples of the scenarios are shown in Table 2.

Discussion

The aim of this study was to identify suitable guidelines for knee MRI administration using the RAND Appropriateness Method (RAM).

The present study is the first study to be done in Iran that used the RAND appropriateness method to design customized guidelines to prescribe knee MRI. Most of the studies that used RAM focused on medical or surgical methods by considering all or part of the following items: frequently used method, one that has high mortality and morbidity, one that used considerable resources, one that has a practice rate widely dissimilar in different geographical areas, and a controversial method regarding its use (9). Many European and US studies had used RAM in clinical cares and reported valid results. Heikes (1994), Stowart et al (2010), and Salari et al's (2013) studies evaluated RAM and concluded that it is a reliable and valid method for assessing the appropriateness of care (18).

Knee pain is one of the most common complains that cause patients referral to physicians, and on average is seen in 20% of the population (14, 19). The healthcare system's limited resources and high cost of MRI demand that physicians pay more attention in administrating MRIs. Therefore designing and performing a clinical guideline in this regard is necessary.

In addition, physicians need daily reliable information about disease prevention, diagnosis and treatment. The large amount of medical information, their differences in validity, inability of the physician to properly evaluate the information and being able to separate accredited from non-accredited information, differences in physicians' decisions about one particular disease, out of date information, inaccessibility to up to date information and the irregularities of scientific texts make the use of current information necessary (20, 21). Therefore, the goal of clinical guidelines is to inform health providers about the latest medical findings and then to change their behavior. However, this process is complex and so has to be performed systematically (10).

Table 2. Samples of MRI indications and scenarios of MRI administrations based on expert panel		
Indications / Scenarios		Appropriateness
Indications (1)	Meniscal disorders	--------
Scenario (1-1)	No displaced	Appropriate
Scenario (1-2)	Displaced tears	Appropriate
Scenario (1-3)	Discoid menisci	Appropriate
Scenario (1-4)	Meniscal cysts	Appropriate
Scenario (1-5)	Complications of meniscal surgery	Appropriate
Indications (2)	Muscle and tendon disorders	--------
Scenario (2-1)	Partial and complete tears	Appropriate
Scenario (2-2)	Tendonopathy	Appropriate
Scenario (2-3)	Ischemia	Inappropriate
Scenario (2-4)	Patellar tendon sleeve avulsions	Appropriate
Scenario (2-5)	Tears Retinacula	Appropriate
Scenario (2-6)	Non-specific inflammation of the tendon	Uncertain

Evidence based medicine is the correct, proper and wise use of the best common evidences in clinical decision making for individual patient. Its best advantage is the use of the most common evidence in clinical practice, healthcare service and management decision making (21). Early researches about the rate of using accredited scientific evidences in clinical and therapeutic decision making and the compliance of provided clinical care with accredited scientific evidence showed disappointing results. It was determined that a deep gap exists between the results of scientific researches and taken practical clinical decisions, to the extent that only 10-20% of physician interventions were in compliance with scientific evidence (22).

Nejat *et al*'s study, evaluating the information resources used by general practitioners in Tehran for acquiring knowledge, showed that less than 32% of participants were familiar with clinical guidelines. Despite the positive attitude of physicians toward clinical guidelines and considering them as useful and trustable, they believed that many barriers exist for using them. Moreover, the low familiarity of physicians with clinical guidelines and their low use show the problems in providing customize evidences and developing customized clinical guidelines (23).

Since defined scenarios in this study are a combination of international scientific literature and the experience of national experts, the developed guideline is accredited and adapted and can help physicians in proper decision making.

Study limitation

Since this was a qualitative research and considering the fact that by changing panel members we could have different results, the study results should be generalized with caution.

Conclusion

The RAND appropriateness method is very useful in identifying the opinion of stakeholders in systems with limited resources. Moreover, developing, customizing and performing clinical guidelines are a challenge in the Iranian healthcare system. Hence, making clinical guidelines practical can lead to the improvement of quality of care in the healthcare system. The result of this study can be used for developing national guidelines and aid health policy makers to consider adopted national clinical evidence in decision making.

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