

## Original Article

# Medical Journal Club as a New Method of Education: Modifications for Improvement

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## Abstract

**Background:** The emerging goals of journal clubs are now considered to be teaching critical appraisal skills and how to use evidence based medicine in practice. Although journal clubs are well accredited, designing the right format to keep members stimulated and educated remains a great challenge.

**Methods:** We conducted journal club structure modifications in internal medicine residency program of a university affiliated hospital. Initially, group-based sessions identified feasible changes and baseline data concerning residents' knowledge of evidence based medicine (EBM) was collected using a questionnaire. Modifications were implemented and a second set of group discussions and data collection took place after 12 months.

**Results:** A total of 78 (86.7%) internal medicine residents participated. The most important identified changes were schedule adjustments and setting new goals regarding EBM, medical statistics and critical appraisal teaching. Group discussion showed increased satisfaction and questionnaire assessments showed significant improvement in residents' knowledge of EBM.

**Conclusions:** Redesigning journal clubs with emphasis on regularity and setting new horizons basically improves their effectiveness. Assigning entire sessions to augment participants' skills in new areas of knowledge is a unique way to fit journal clubs as a novel and innovative teaching practice.

**Keywords:** Evidence-based medicine, journal club, residency

**Cite this article as:** Sadeghi A, Biglari M, Nasser-Moghaddam S, Soltani A. Medical Journal Club as a New Method of Education: Modifications for Improvement. *Arch Iran Med.* 2016; **19(8)**: 556 – 560.

## Introduction

The earliest reference to the origin of the phrase 'journal club' is in memoirs and letters of Sir James Paget, describing a small room near St. Bartholomew's Hospital in London in the period 1835–1854 in which pupils met and read journals.<sup>1</sup> More than a century has passed since Sir William Osler started the first recorded journal club in North America in 1875 as a way of sharing periodicals he could not afford individually and later established a club at Johns Hopkins University to review the latest medical research.<sup>2,3</sup> Today's journal clubs have evolved a great deal and are found in nearly every medical school and residency training program in almost all fields of medicine.<sup>4-6</sup>

Traditionally, journal clubs are educational meetings in which a group of individuals meet to discuss and critically evaluate current articles in the scientific literature.<sup>7,8</sup> The major aim of journal clubs was to keep their attendees up to date with the latest medical literature.<sup>4,9,10</sup> Gradually, they have become a means for teaching critical appraisal skills, improving biostatistical

knowledge, becoming familiar with epidemiologic methods and most recently, promoting the practice of EBM.<sup>4,8,11</sup>

Critical appraisal skills and basing clinical decisions on the best published evidence available (i.e., EBM) have become an important facet in clinical medicine and are part of the core general competencies required by the Accreditation Council for Graduate Medical Education (ACGME) in all residency programs.<sup>12-14</sup> In the ensuing years, EBM has enjoyed widespread popularity. Today's journal clubs are effectively assisting practitioners to translate knowledge into practice and serve as an excellent bridge between research and clinical work.

While journal club has been a mainstay in postgraduate medical education for many years, several authors have pointed out the diversity of its format.<sup>2,5,15</sup> The desirability of journal clubs in internal medicine has been reinforced by accreditation requirements that mandate residents' participation in journal clubs. Although the goals and purposes of journal clubs are well established, selecting the right format and settings to keep members stimulated and educated remains a great challenge.<sup>16,17</sup>

With the growing appreciation of EBM and its widespread application in clinical decision making, we thought of revising and implementing possible modifications in our journal club structure to improve the quality of sessions and assess their effects on our journal club efficacy.

## Materials and Methods

### Study protocol

First, we conducted group-discussion sessions with participation of two clinical experts, two research experts, the residency

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Accepted for publication: 1 June 2016

program manager and the chief resident of internal medicine. Group discussion primarily consisted of brain storming, reviewing similar works and their outcomes and sharing experiences. Five such meetings were held with the main purpose of gauging current program features and identifying possible essential changes required to improve the program. The findings of these sessions were then shared with residents' representatives (2 residents from each year), in three separate sessions. Identified feasible modifications were finally determined through group-based discussions and implemented to make a new journal club structure.

The group-discussions were held for a second time, 12 months after executing alterations. Group participants were the same. This time, the group assessed different aspects of changes made, including residents' attendance, residents' satisfaction and the content of new sessions.

Furthermore, we measured the residents' existing knowledge of EBM using a self-reported questionnaire, designed and internally validated by the discussion group. The questionnaire consisted of three questions to assess three fields: residents' knowledge of statistical significance, their acquaintance with evidence rating and their familiarity with study design. Possible answers were "No familiarity", "Fair familiarity", "Good familiarity" and "Excellent familiarity" scored from 0 to 3. The total score was calculated in the range of 0–9.

#### Outcome measures

In order to facilitate further comparison, the first two answers were classified as cluster 1 (limited knowledge) and the two remaining answers as cluster 2 (acceptable knowledge); therefore, making comparison possible between the two clusters. Residents' total scores before and after modifications were also calculated and compared as a measure of accuracy. Each resident was given the questionnaire before applying changes and again 12 months after running the new program. Residents' responses were also discussed in the second set of group-discussions. Figure 1 shows the major steps we followed for this study.

#### Data analysis

The results were collected anonymously. We specified the distribution of answers in each cluster before and after modifications and calculated the absolute difference between them using descriptive statistics. Also, we compared total scores using independent *t*-test in SPSS statistical software ver. 21.0 (Chicago, Illinois, USA). A *P*-value of less than 0.05 was considered significant.

## Results

Seventy-eight out of 90 (86.7%) internal medicine residents (43 females) were included in the survey. An almost even participation was observed among residents from all years of internal medicine training. Results are presented in two phases: at the beginning and after implementing modifications.

#### Phase I

Founded on the primary group-based discussions, the acknowledged key points for developing our new journal club structure encompassed program and schedule modification, adding motives, defining new goals, content revision and providing feedback mechanisms from which, content revision was considered the most critical one. The main aspects of modifications made are explained in detail.

Our new schedule was designed as weekly sessions on Thursdays (the day preceding weekend in our country). We planned the sessions to be held from 7 to 8 in the morning (breakfast time) and on the day with minimal educational and clinical workload to assure maximal attendance. To ensure the regularity and predictability of our program, we already scheduled the sessions for the entire coming year. Holidays, exam days and residents' rotations were carefully noticed in planning the journal club calendar and the presenter for each session was assigned at the beginning of the educational year.

Furthermore, we moved to a more spacious room with better facilities. We also provided a light breakfast during all sessions so the residents did not need to worry about sparing time for it.

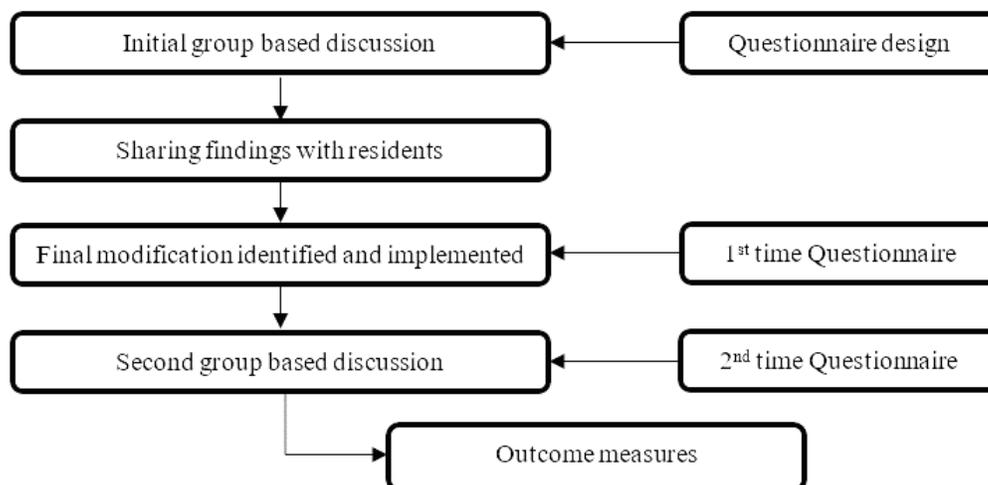


Figure 1. The major steps taken for modifications.

Defining new objectives was also emphasized by group members. Therefore, we set our new goals not only to keep up to date with and review the current literature, but also to introduce medical statistics to residents, encourage arguments and develop critical appraisal skills and understanding EBM. We changed the composition of our journal club participants to include relevant attending physicians, medical statisticians and experts in EBM and critical thinking as well as internal medicine residents from all levels.

In order to achieve the broad goal spectrum, our reformed program consisted of two different types of sessions. Three sessions of each month were dedicated to presenting review articles and discussion about the main topic (similar to the former program). The last week of the month was devoted to evidence based journal clubs in which an original article was presented to the audience and 2 to 3 relevant articles or guidelines were also discussed. The main focus of these sessions was to discuss the methodology and point out statistical points through which critical appraisal skills were practiced and evaluation of the quality and validity of the results reviewed.

Both types of sessions were moderated by an attending physician with good educational background and experience in clinical research. Review article journal clubs were presented by a second year internal medicine resident using slideshows; each resident was given the opportunity to benefit from this chance at least twice a year. Evidence based journal clubs were presented by senior residents familiar with medical research and statistics and with acceptable teaching skills. These sessions were supervised by a team (at least 2 persons) of expert physicians in EBM and critical thinking skill.

A support committee consisting of two senior internal medicine residents, a journal club moderator and an EBM expert was formed for evaluating and choosing articles for presentation. The responsible resident had to provide up to 5 papers to the committee, who would then return one or two for presentation. Of course, he/she could have a discussion with experts before presentation for both types of session. The major selection criteria were relevance and novelty of the topic and being interesting to the participants. Another thing considered especially for articles to be presented in EBM sessions was being somehow controversial regarding the methodology or conclusion.

At the end of each session, a brief explanation was provided including critical points and a conclusion. For EBM sessions, the strengths and limitations of the article were also emphasized, inspiring the participants to involve in this process valuable in didactic endeavors. The conclusion of each session was then uploaded in the departmental forum of residents and interns for more discussion. Sometimes, a practical question was also

provided in order to ascertain that residents had gotten the point correctly.

#### Phase II

Group-discussion findings for the new schedule clearly showed increased attendance (40% absolute change) and the residents were more satisfied with the fixed and pre-defined sessions. Nonetheless, we noticed that providing food was not among residents' concerns.

Definition of new objectives for journal club sessions persuaded residents to participate more. Experts in the group-discussions were also satisfied with the new content of sessions and the monthly devotion of an entire session to EBM and discussing statistical points and critical thinking.

Regarding questionnaire assessment, the final results showed that in the field of "evidence rating knowledge", the number of residents in cluster 1 was reduced from 51 to 17 and accordingly, the number of residents in cluster 2 increased from 27 to 61 (43.6% absolute change regarding the total number of participants). In other words, evidence rating knowledge was improved in 34 residents.

Similarly, before-after comparison for the field of "statistical significance acquaintance" revealed the absolute change to be 23.1%; i.e. the residents' acquaintance with the concept of statistical significance was augmented, improving from limited knowledge to acceptable knowledge in 18 residents. The absolute change for "study design familiarity" field was reported as 39.7% (from 51 to 20 in cluster 1 and from 27 to 58 in cluster 2). Table 1 shows the overall result of answers and their comparison before and after journal club structural alterations. The final results comparing residents' knowledge before and after the changes are illustrated in Table 2.

Accuracy measure with independent *t*-test showed that the mean total score of residents before comparison was different before and after modifications (4.8 vs. 6.2;  $P = 0.02$ ). The same result was observed for each of the three questions (Table 3).

## Discussion

The internal medicine journal club at Shariati Hospital, Tehran University of Medical Sciences started in 2007. Initially, it was run in a small room on a weekly basis with focus on review article presentation only. Participants were mainly residents, internal medicine interns and medical students and presenters of sessions were selected from the first year residents.

There are considerable studies describing journal clubs conducted in different settings and for different health providers; yet there appear to be no 'Gold Standard' approach for conducting

**Table 1.** Preliminary results of self-reported questionnaire and results after 12 months of modifications.

	No familiarity, <i>n</i> (%)		Fair familiarity, <i>n</i> (%)		Good familiarity, <i>n</i> (%)		Excellent familiarity, <i>n</i> (%)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Evidence rating knowledge	14 (18)	0 (0)	37 (47.4)	17 (21.8)	17 (21.8)	44 (56.4)	10 (12.8)	17 (21.8)
Statistical significance acquaintance	6 (7.7)	0 (0)	24 (30.8)	12 (15.4)	30 (38.4)	36 (46.1)	18 (23.1)	30 (38.5)
Study design	12 (15.4)	0 (0)	39 (50)	20 (25.6)	18 (23.1)	43 (55.2)	9 (11.5)	15 (19.2)

**Table 2.** Comparing results as cluster 1 and cluster 2 before and after modifications.\*

	Cluster 1, <i>n</i>		Cluster 2, <i>n</i>		Absolute change, <i>n</i> (%)	<i>P</i> -Value
	Before	After	Before	After		
Evidence rating knowledge	51	17	27	61	34 (43.6)	<0.001
Statistical significance acquaintance	30	12	48	66	18 (23.1)	<0.001
Study design familiarity	51	20	27	58	31 (39.7)	<0.001

\*: Cluster 1 = limited knowledge; Cluster 2 = acceptable knowledge.

**Table 3.** Mean score of questionnaire compared before and after changes.

Question	Mean before	Mean after	<i>P</i> -Value
Study design familiarity	1.9	2.7	0.03
Statistical significance acquaintance	1.6	1.5	0.03
Evidence rating knowledge	1.2	2.4	0.01
Total score	4.8	6.2	0.02

a journal club or assessing its effectiveness. It is therefore an ongoing challenge in designing an effective journal club format that assists the participants to translate journal club activities into evidence based practice.<sup>18</sup> As residency programs deal with work-hour restrictions and implement competency education,<sup>19,20</sup> they need to undergo intense reassessment and possible remodeling to determine if they meet their goals.

Our questionnaire survey showed that our reformed program changed residents' knowledge and the number of residents shifted from low knowledge to acceptable knowledge.

We postulated that holding journal clubs on a regular basis is necessary to achieve continuous educational progress and gradually obtain the desired improvement in residents' competency which is in accordance with most previous studies.<sup>18</sup> Regularity of sessions basically show the importance of this type of learning, as a new method of education is being introduced to the learners (residents). On the other hand, disorderliness might suggest that the program is not so useful and coordinators are not sure of its value, which in turn will dissuade participants from joining and following the schedule.

Pre-defining the whole schedule will be an excellent way to achieve this goal. Although fixed schedule might seem impractical for some institutes, the authors assumed that accurately considering some fine points such as work-hour prerequisites before scheduling the program may be helpful. In addition, this would assist participants to adjust their time and for the presenter to know their schedule and prepare for that.

Most studies point out that a once a month journal club is best accepted.<sup>21,22</sup> Our reformed structure had a weekly basis, though our new EBM sessions were held monthly, in order not to diminish residents' enthusiasm for participating in these educational gatherings.

Some studies have shown that the timing of journal clubs might be of importance in terms of attendance, especially when they coincide with meal times.<sup>23,24</sup> While they advised provision of food as a way to increase attendance, our group discussions and residents' feedbacks did not show such a relation. This might be due to the relatively short duration of our sessions, the type of breakfast and the way it was provided.

The authors believed that forward movement without adding new goals and/or lacking enough motivation would not be successful in improving participants' competency. Increasing knowledge of medical statistics and understanding EBM were the primary new objectives of our program which is demonstrated to be well achieved regarding our survey.

Participants of journal clubs must be in accordance to the aims and contents of the program. Similar to Hartzell,<sup>17</sup> the authors believe that inviting attending physicians and involving senior residents may contribute to fulfillment of journal club objectives. This composition would facilitate the arguments and provide space for better discussion and reaching a practical point. Assigning an entire separate session to introduction of this new area would also be of great benefit, since innovative thinking and learning new skills require more time.

New educational goals for residency programs now include conduction of problem-oriented sessions, evidence based journal clubs and also experiencing critical appraisal. Considering that almost all medical education programs have introduced journal clubs as a routine in their curricula, we thought of it as a useful tool to familiarize our residents with better interpretation of medical literature, critical thinking and evidence based medicine. This approach has been supported by previous researches.<sup>19,25</sup>

Although this survey showed promising results and improvement in residents' knowledge and participation, our results are far from perfect. Still, we must increase our efforts to recognize subtle obstacles and further improve the effectiveness of journal clubs. On the other hand, since the implied alterations were mostly simple and easily available, it seems that this structure is generalizable to other institutes and disciplines.

In conclusion, journal clubs are of great value in today's medical education, addressing the improvement of both clinical practice and evidence based learning. Yet, there is no gold standard to achieve the best result with this regard. We have enjoyed revolutionizing our traditional structure of journal clubs and furnishing it with novel objectives and construction and noticed improvement in attendance and competency of our internal medicine residents.

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