21st Century Evidence-Based Medicine (EBM)

Teaching Evidence-Based Medicine to Medical Students using a Virtual Journal Club: A mixed method study

Collaborative with Dow International Medical College, Karachi, Pakistan (2022)

Paulo B. Pinho, MD
Chief Medical Officer
www.Journalclub.net
Sir James Paget

"a kind of club... a small room over a baker’s shop near the Hospital-gate where we could sit and read the journals."

Sir William Osler

For “the purchase and distribution of periodicals in which he could not afford to subscribe”

Dr. Tinsley Harrison

Bimonthly meeting where one member of the group would present a research paper and others would critique it


• **Germany in the early 1900’s**
  - Departments of Medicine and Medical Schools began to use them
  - Evolution for continuing medical education

• **Since 1980’s**
  - Teach critical appraisal skills
  - Maintain current the growing body of medical knowledge

Growing Body of Medical Knowledge

Diminishing Physician Time

Growing Number of Scholarly Papers

"One of the commonest complaints of practicing physicians is their difficulty in keeping up with medical literature." – Nathan Flaxman, MD

• “If physicians would read two articles per day out of the six million medical articles published annually, in one year, they would fall 82 centuries behind in their reading.”

• “What was learned in the first 3 years of medical school will be just 6% of what is known at the end of the decade from 2010 to 2020.” – Peter Densen
Background – Evolving Journal Club to Keep Pace in the Storm

- Paper Based
- Disorganized
- Time Consuming
- Technology Challenged

There is no Virtual Journal Club Platform!

Enter a Virtual Journal Club Platform!
Tomorrow’s EBM Experience Available Today
Aims

• Assess the **feasibility** of educating a diverse healthcare practitioner participant pool Evidence-Based Medicine (EBM) concepts in a two-day workshop

• Perform a **mixed methods study** to evaluate a novel Virtual Journal Club (VJC) tool – JournalClub.net

• **Measure ease, comprehensiveness and effectiveness** of EBM learning through Pre and Post survey analysis
Methods

• Ninety-nine (99) participants attended a 2-day EBM workshop
  • Undergraduate medical, dental and pharmacy students
  • Postgraduate medical trainees
  • Practicing physicians

• Structure of workshop
  • Day 1 - introduction to EBM and its principal concepts
  • Day 2 - practical sessions and smaller group discussions using JournalClub.net
  • Surveys - A pre course self-assessment and practice survey and post course outcomes survey with Likert scale questions
  • Quiz – an EBM quiz was administered to participants
N=99 Entrants

Pre-Workshop

N=98 Completed Pre-Workshop Survey

N=1 Did Not Complete Pre-Workshop Survey

Pre-Workshop EBM Attitudes and Beliefs

<table>
<thead>
<tr>
<th>Response</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBM is Crucial to Physician Practice</td>
<td>98 (99%)</td>
</tr>
<tr>
<td>EBM is Necessary for Optimal Treatment</td>
<td>98 (99%)</td>
</tr>
<tr>
<td>Incorporating Research into Care Provision is Important</td>
<td>98 (99%)</td>
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Pre-Workshop EBM Skillset

<table>
<thead>
<tr>
<th>Skill</th>
<th>n (%)</th>
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<tr>
<td>Locating Professional Literature</td>
<td>98 (99%)</td>
</tr>
<tr>
<td>Searching Online Databases</td>
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</tr>
<tr>
<td>Critical Appraisal Skills</td>
<td>98 (99%)</td>
</tr>
<tr>
<td>Identifying Knowledge Gaps</td>
<td>98 (99%)</td>
</tr>
<tr>
<td>Critical Appraisal Appraisal of Scientific Literature</td>
<td>97 (98%)</td>
</tr>
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<td>Identifying Patient-Relevant Clinical Questions</td>
<td>98 (99%)</td>
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Workshop

N=89 Completed Post-Workshop Survey

N=10 Did Not Complete Post-Workshop Survey

Virtual Journal Club (VJC) Usability and Effectiveness

<table>
<thead>
<tr>
<th>Response</th>
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<tbody>
<tr>
<td>VJC is effective and efficient for EMB skills learning</td>
<td>89 (90%)</td>
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<td>VJC makes EBM learning less intimidating</td>
<td>89 (90%)</td>
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<tr>
<td>VJC interface was easy and intuitive to use</td>
<td>89 (90%)</td>
</tr>
<tr>
<td>I would recommend VJC to others</td>
<td>89 (90%)</td>
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Virtual Journal Club (VJC) & Workshop Value to EBM and Critical Appraisal

<table>
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<th>Response</th>
<th>n (%)</th>
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<tr>
<td>VJC is more effective at EBM training than traditional methods</td>
<td>89 (90%)</td>
</tr>
<tr>
<td>Workshop led to confidence in critical appraisal</td>
<td>89 (90%)</td>
</tr>
<tr>
<td>Workshop led to improved EBM skills</td>
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EBM and Critical Appraisal Skills

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<th>Response</th>
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<tr>
<td>Reading and Appraisal Tool Made Learning Easy</td>
<td>89 (90%)</td>
</tr>
<tr>
<td>VJC Facilitates Critical Appraisal of Scientific Papers</td>
<td>49 (49%)</td>
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Results – Pre-Workshop

Pre-Workshop EBM Attitudes and Beliefs (n=98)

<table>
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<tr>
<th></th>
<th>EBM is Crucial to Physician Practice</th>
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<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Neutral</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Agree</td>
<td>38</td>
<td>45</td>
<td>49</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>57</td>
<td>50</td>
<td>44</td>
</tr>
</tbody>
</table>

96% answered Agree or Strongly Agree to the Relevance of EBM and Research
### Results – Pre-Workshop

#### Pre-Workshop EBM Skillset

- **Locating Professional Literature (n=98)**
  - Advanced: 5
  - Above Average: 24
  - Average: 54
  - Limited: 12
  - Poor: 3

- **Searching Online Databases (n=98)**
  - Advanced: 10
  - Above Average: 33
  - Average: 45
  - Limited: 8
  - Poor: 2

- **Critical Appraisal Skills (n=98)**
  - Advanced: 4
  - Above Average: 18
  - Average: 46
  - Limited: 8
  - Poor: 3

- **Identifying Knowledge Gaps (n=98)**
  - Advanced: 5
  - Above Average: 16
  - Average: 50
  - Limited: 3
  - Poor: 4

- **Critical Appraisal Appraisal of Scientific Literature (n=97)**
  - Advanced: 6
  - Above Average: 17
  - Average: 47
  - Limited: 4
  - Poor: 4

- **Identifying Patient-Relevant Clinical Questions (n=98)**
  - Advanced: 8
  - Above Average: 36
  - Average: 41
  - Limited: 12
  - Poor: 1

69% answered that their baseline EBM and Critical Analysis Skills were Average or Below.
Results – Post-Workshop

Virtual Journal Club (VJC) Usability and Effectiveness

- **VJC is effective and efficient for EMB skills learning (n=89)**
  - Strongly Agree: 29
  - Agree: 43
  - Neutral: 14
  - Disagree: 0
  - Strongly Disagree: 3

- **VJC makes EBM learning less intimidating (n=89)**
  - Strongly Agree: 32
  - Agree: 41
  - Neutral: 13
  - Disagree: 1
  - Strongly Disagree: 2

- **VJC interface was easy and intuitive to use (n=89)**
  - Strongly Agree: 28
  - Agree: 45
  - Neutral: 15
  - Disagree: 0
  - Strongly Disagree: 1

- **I would recommend VJC to others (n=89)**
  - Strongly Agree: 41
  - Agree: 34
  - Neutral: 11
  - Disagree: 1
  - Strongly Disagree: 2

82% answered Agree or Strongly Agree to the Value and Effectiveness of VJC
Results – Post-Workshop

Virtual Journal Club (VJC) & Workshop Value to EBM and Critical Appraisal

- VJC is more effective at EBM training than traditional methods (n=89)
  - Strongly Agree: 33
  - Agree: 45
  - Neutral: 10
  - Disagree: 0
  - Strongly Disagree: 1

- Workshop led to confidence in critical appraisal (n=89)
  - Strongly Agree: 30
  - Agree: 38
  - Neutral: 17
  - Disagree: 3
  - Strongly Disagree: 1

- Workshop led to improved EBM skills (n=89)
  - Strongly Agree: 30
  - Agree: 42
  - Neutral: 16
  - Disagree: 0
  - Strongly Disagree: 1

82% answered Agree or Strongly Agree to the Impact of VJC and Workshop to EBM and Critical Appraisal Skills
Results – Post-Workshop

EBM and Critical Appraisal Skills

82% answered Agree or Strongly Agree to the Acquisition of EBM and Critical Appraisal Skills

<table>
<thead>
<tr>
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<th>Reading and Appraisal Tool Made Learning Easy (n=89)</th>
<th>VJC Facilitates Critical Appraisal of Scientific Papers (n=49)</th>
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<tbody>
<tr>
<td>Strongly Agree</td>
<td>33</td>
<td>28</td>
</tr>
<tr>
<td>Agree</td>
<td>40</td>
<td>13</td>
</tr>
<tr>
<td>Neutral</td>
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</tr>
<tr>
<td>Disagree</td>
<td>1</td>
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<td>1</td>
<td>0</td>
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Limitations

- **Incomplete participation** in the pre- and post-workshop surveys
- **Quiz results format not lent** to statistical analysis
  - Pre and post-test on EBM concepts is a better format
  - Peer-reviewed article critical read should be included in a more robust post-test
- **Short exposure** - longer formalized education would contribute to better ease of use and mastery
- **Biases** – recall, group think, authority bias, anchoring bias
- **Mixed methods study** – case-control format with traditional journal club in a more educationally matched cohort
Conclusions

• **History** - Journal club has existed for nearly 2 centuries for socialization, knowledge sharing, continuing education and expanding knowledge, teaching critical appraisal

• **The Perfect Storm** - Growing medical knowledge, scholarly papers and physician time constraints

• **Legacy Constraints** - To date, formats are paper based, disorganized, time intensive and tech challenged

• VJC is a novel, tech forward, streamlined and efficient way to teach critical knowledge analysis and EBM techniques