

Critical Appraisal

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Critical appraisal is the process of reading published research to make a judgement on its scientific value (validity), and to consider how its results can be applied in family and community practice (applicability). There are four main elements of critical appraisal in EBFP i.e., relevance, validity, results, and applicability. Some family practitioners are not so comfortable with appraisal because of their poor background in research. But we developed the guide questions for critical appraisal simple and provide advice on what and where to look for it in the published evidence.

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Definition of Critical Appraisal

Critical appraisal is the process of reading published research to make a judgement on its scientific value (validity), and to consider how its results can be applied in family and community practice (applicability). Validity is usually based on whether the study has been properly conducted and the results can therefore be trusted. This process was made easier by the development of simple guide questions for assessing the quality of evidence. A series was initially published in the Canadian Medical Association Journal and later the “Users’ guides to the medical literature”, which appeared in the Journal of the American Medical Association.¹

Main Elements of Critical Appraisal in EBFP

Methodological quality assessment is an important step before applying the results of the study in clinical practice. This is usually done by assessing the quality of the article or critical appraisal. There are several critical appraisal tools that an evidence-based practitioner can choose from.² There are four main elements of critical appraisal in EBFP i.e., relevance, validity, results, and applicability. Some family practitioners are not so comfortable with appraisal because of their poor background in research. But we developed the guide questions for critical appraisal simple and provide advice on what and where to look for it in the published evidence.

Relevance to the Clinical Problem

The first step is to look at the objective of the study which is usually in the last paragraph of the introduction or background section

of a published research article. Identify the PICO or PIO or elements of your clinical question in the objectives of the study and correlate this with your clinical question. If the elements are present, then the article is likely to be relevant.

Validity of the Evidence

Methodological quality (risk of bias) assessment is an important step before utilizing the results and applying it to family and community practice. There are existing reviews that provide tools that can distinguish the types of medical studies and choose appropriate tools for assessing its methodological quality.² The physician’s ability to determine the validity and reliability of research findings will depend on understanding bias in research.

Bias in research is simply defined as deviation from the truthful results. While it exists in all research designs and can happen in the different stages of the research process, there are strategies to avoid or minimize it. There are three main types of bias in clinical research, selection bias, detection/information bias and confounding. Selection bias arises from the way the subjects were recruited, methods affecting the study participation and final composition of the study population or assignment to treatment groups. This type of bias is reduced by random selection of participants in observational studies, or randomization of participants in clinical trials. This can also be reduced by having a clearly defined inclusion and exclusion criteria for the study and minimizing dropouts and account for withdrawals (addressing attrition bias).³ Another bias is detection or information bias which can result from distortions when collecting exposures and outcomes information. This can be reduced by establishing the validity and reliability of measurements like scoring systems for quality of life, symptoms, or

risk. In observational studies, the method of data collection must first be pilot tested for its capacity to obtain the needed information.⁴ Another factor which may affect validity is confounding. Some trials on treatment may have other treatment given to patients that might modify the effect of the treatment being evaluated.³

The biases previously discussed relates to the data collection and analysis in research. After the research has been completed publication bias also occur. Publication bias refers to the editorial decision to publish a study. The bias is toward favorable submission and acceptance for publication those studies that showed positive results. Studies with negative results or showed no statistically significant findings are often not published. Studies with significant or positive results were more likely to be published than those with non-significant or negative results. They also tend to be published earlier than studies with non-significant results, and empirical evidence suggests that published studies tended to report a greater treatment effect than those from the grey literature. Non-English-language studies also appeared to result in a high risk of publication bias.⁵ Thus, a search in the published literature like PubMed will likely show a positive result.

Results

Clinical research results are presented in many different ways. In randomized controlled trials, cohort studies and case-control studies the results are often expressed as risk in each group. Risk is the frequency with which an outcome occurs in the group i.e., those with the outcome divided by the total number of subjects in that group. To determine the association between the two groups, the risk in the intervention group is divided by the risk in the control group and the product is the risk ratio (RR). If the outcome is measured as the odds of an outcome occurring in a group (those with the outcome/those without the outcome in the group), then the association of the odds when the odds in the intervention group is divided by the odds in the control group is the odds ratio (OR). If the RR or OR is 1, there is no difference between the two groups. If the outcome is positive i.e., cure rate, an OR or RR of more than 1 means that the outcome occurred more in the intervention group than the control group, making the intervention beneficial. If the outcome is negative i.e., death, then the OR or RR should be less than 1 for the intervention to be beneficial. If it is greater than 1 then the intervention is harmful.

If the result is beneficial or harmful, the next thing to look for the statistically significance i.e., the results did not occur by chance. There are two ways to know this. First is the p-value of less than .05, which means that the probability that the measured RR or OR was only by chance is less than 5%. The second is the 95% confidence interval, which gives the range that the true RR or OR will be in this range 95% of the time. For the RR or OR to be significant, the intervals should not include 1 i.e., if the RR or OR is greater than 1, then the lower limit of the interval should also be greater than 1 and if it is less than 1, then the upper limit of the interval should be less than 1.

Applicability of the Results

The patient characteristics usually the first table or paragraph of the results section are important to determine if the results of the study can be applied to the patient. The family practitioner needs to assess if the characteristics of the study population in the article and the characteristic of the patient to whom a clinical decision will be made are relatively similar.⁶ Patient preference is another factor to consider the applicability of the results in the evidence. The beneficial outcomes presented in the study must also be the preferred outcome of the patient.⁶ Patient preference may also be affected by the patient's capacity and willingness to pay for the intervention in the pay-for-service setting or the health insurance coverage. This is vital to the process of shared decision making that is recommended in the EBFP framework.

The skills and setting of the family practitioner must have the necessary resources to provide the intervention as described in the evidence. The resources need include physical, technological, and personnel to provide the intervention. The skills include assessment skills, intervention, communication and engagement skills with the patient. While family practitioners have been trained in clinical assessment and intervention, there is a need to emphasize communication and engagement skills which involve the capacity to convey information clearly and appropriately. They should also have the skills to listen, observe, adjust, and negotiate and motivate the patient to achieve an agreed-upon management plan.⁶

SUMMARY

In summary critical appraisal in EBFP is a simple way of evaluating the relevance, quality, results and applicability in family practice. This is usually done to answer a clinical question in support of decision making. EBFP however we emphasize that clinical decision making must be a shared decision making between the patient and family doctor. A real shared decision making can only be realized if the information obtained after the critical appraisal can be translated to a format that patients can understand.

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