PICOT Framework for Exploring Evidence and Developing Care Practices

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The PICOT framework is integral to the research of Evidence-Based data that can be used in the implementation of evidence into clinical practice (Gallagher Ford & Melnyk, 2019). The framework is made up of specific parts that flow together to create a question that includes terms to make researching evidence more focused, effective and without bias. The format of PICOT is population, intervention, comparison, outcome, and time (Gallagher Ford & Melnyk, 2019). Using the framework of PICOT, the author will describe a clinical issue surrounding patients at risk for preeclampsia and locate resources for evidence that may help answer the proposed question, explain data found in the resources, and demonstrate relevance of that data.

Use of the PICO(T) Approach when Caring for Patients with Preeclampsia

Preeclampsia is the leading cause of maternal and neonatal morbidity and mortality in the United States (Bryant et al., 2020). This issue would benefit from the use of the PICOT framework as the majority of current clinical practice lags behind research. Exploring the issue using the PICOT framework has the possibility of decreasing maternal and neonatal morbidity and mortality. There have been a few very important advances in the early treatment and prevention of preeclampsia, which have positively affected both neonatal and maternal outcomes. One such advancement is the use of low dose aspirin to treat and prevent poor outcomes (Bryant et al., 2020). To be the most effective, aspirin treatment must begin before the 16th week of pregnancy (Bryant et al., 2020). Most obstetric clinics use the ACOG or NICE screening methods to determine risk to decide if treatment with aspirin is warranted. These screening methods are not very effective in identifying those at risk, so more effective methods could be useful at preventing adverse outcomes. The specific practice issue that will be discussed in this paper is the efficacy of different models of screening for risk stratification used to decide

on implementation of aspirin for the early treatment of preeclampsia. Using the PICOT

framework, the question is: for pregnant patients in their first trimester, is a method that includes

patient history and maternal features, along with biophysical markers more effective at

identifying those at risk for the early development of preeclampsia than the current method that

only utilizes patient history and maternal features. The findings from three resources will be

summarized, and the most credible source will be discussed more in depth.

Sources of Evidence

Evidence can be found in many places online and in print, but best practice it to search

for evidence for answering a PICOT question in databases and journals. These sources contain

peer reviewed articles and research studies, externally validated data from randomized control

studies, metanalysis and systematic reviews. The method chosen to evaluate the credibility of the

sources is the CRAAP method, which employs these topics for assessment of the source,

currency, relevance, authority, accuracy, and purpose (Sye & Thompson, 2023). The three

resources were located in databases such as google scholar and the Capella University library

databases that passed the CRAAP test for credibility and they will be discussed more in depth in

subsequent paragraphs.

ACOG/NICE prediction framework as a basis for comparison

Clinical practice in most of the United States involves using some combination of

maternal risk factors and patient history to determine the risk for developing preeclampsia. The

most used methods are the American College of Obstetrics and Gynecology model (ACOG) and

the National Institute for Health and Care Excellence model (NICE). This method involves an

assessment of maternal risk factors including body mass index, maternal history of hypertensive

disorders, history of diabetes, autoimmune disorders, age, thrombophilias, familial history of cardiovascular disorders, etc (Tan et al., 2018). There have been few studies done in the past 5 years to determine this method's effectiveness at predicting preeclampsia, but one recent expert review suggests that the ACOG method has a 2-5% prediction rate with a 0.2% false positive rate (Poon et al., 2020). Another study states the prediction rate for the NICE method as being 30% with a 10% false positive rate (Tan et al., 2018). This information is relevant to our PICOT question as it gives us a baseline for comparing the possibility of using newer evidence with higher detection rates to determine risk for preeclampsia.

FMF screening method

The method of risk detection discussed in the following articles is what is referred to as the triple test, or The Fetal Medicine Foundation prediction model (FMF) (Chaemsaithong et al., 2019). This test uses a multivariate approach, consisting of maternal risk factors, mean arterial pressure (MAP), uterine artery pulsatility index (UtA-PI), and serum biomarkers, namely placental growth factor (PlGF) (Chaemsaithong et al., 2019).

In an opinion paper titled "From first-trimester screening to risk stratification of evolving pre-eclampsia in second and third trimesters of pregnancy: Comprehensive approach." by Poon et al, 2020, regarding the use of the FMF model of prediction, experts suggest that the multivariate FMF model and others like it can effectively predict at a greater sensitivity those who may go on to develop early and preterm preeclampsia. The paper also mentions that the methods used currently in clinical practice (ACOG and NICE) are ineffective at identifying those at risk and more effective methods should be integrated into clinical practice (Poon et al., 2020). It summarizes the Aspirin for Evidence-Based Preeclampsia Prevention or ASPRE study from 2017 that uses the FMF method to assess risk for preeclampsia to determine whether aspirin

should be used to treat and prevent development of preeclampsia, and states that the FMF model detected 77% of cases of preeclampsia in the ASPRE study (Poon et al., 2020). The strengths of this article are that it is a clear summary and synopsis of current research written by one of the leading researchers in the field and on the topic of preeclampsia. While this resource passes the credibility check using the CRAAP test, the fact that it is an opinion paper makes it our lease credible source of research, but it is a good starting point with valid and relevant references cited.

The Screening Program for Preeclampsia (SPREE) study shows that multivariate screening models such as the FMF model show promise to be integrated into routine antenatal testing. A comparison study using the results from this study was published in 2018 (Tan et al., 2018). This was a multicenter cohort study covering 7 maternity centers in England, the sample size was 16,747 participants and covered a large variety of racial and socioeconomic backgrounds (Tan et al., 2018). This study compares the NICE model to the multivariate model (FMF model) and found that using multivariate model including maternal factors, MAP, PtA-PI, and PlGF, the detection rate of preeclampsia neared 82% as compared to 30% detection rate for the NICE model (Tan et al., 2018). This article is relevant as it directly compares the two methods specified in our PICOT question.

In a subsequent study by Chaemaithong et al, 2019, using the same multivariate method, similar results were found. This study serves as one of the studies used as external validation in a different population of the above-mentioned study which helps boost its credibility. This study shows a detection rate of 78% at a 20% false positive rate, which is significantly more effective than maternal risk factors alone (ACOG and NICE) (Chaemsaithong et al., 2019). This is the one of the most credible pieces of research to be included in this paper, as it is a mulitcenter prospective study spanning 11 centers and 7 regions in Asia and includes a large study

population of over 10,000 participants (Chaemsaithong et al., 2019). This study proves relevant as it directly relates to our PICOT question and gives us promising evidence that points to the benefits of including MAP, UtA-PI, and PlGF testing in new clinical procedures for the prediction of developing preeclampsia. (Chaemsaithong et al., 2019)

Conclusion

In conclusion, current methods of risk detection for preeclampsia in clinical practice may benefit from updated evidence and exploring the topic using the PICOT framework. Multiple relevant, clear and validated sources of information were located and identified, and the findings summarized. The articles all agree that using the FMF model for risk detection over the use of ACOG or the NICE model improves detection rates, and can be applied to the clinical risk stratification for implementing aspirin treatment to prevent developing preeclampsia.

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