Adding to the Evidence Base: A Critique of ‘Predicting Urinary Tract Infections in a Urogynecology Population’

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Although it is true that retrospective research designs carry with them their own set of advantages and disadvantages, they offer researchers opportunity to consider data that may not be possible to review in an experimental design. Readers need to review both the design and the type of data considered when evaluating a research report. The purpose of this review will be to examine the current retrospective study design (Kuklinski & Koduri, 2008) and place it within the Melnyk and Fineout-Overholt (2005) criteria for inclusion of research into the evidence base. The importance of the study will be discussed, as will the way terminology is used in research reports and the logistic regression analysis used.

Critique

In retrospective research, the proposed cause and the proposed effect have already occurred. Therefore, researchers are trying to link a current phenomenon with preexisting data and attempting to determine if the outcome that is presently noted is supported by the previous data (Polit & Beck, 2008). These studies are considered by some (Burns & Grove, 2005) to be less powerful than a prospective design in terms of specifying causality. The information obtained through this type of research provides impetus to conduct further prospective studies to support findings of retrospective designs. Retrospective studies also avoid ethical issues of giving a treatment to one group and denying it to another.

As is the case of the current study (Kuklinski & Koduri, 2008), the retrospective correlation design is effective in examining outcomes, such as treatment of urinary tract infections in females, that may eventually lead to a consistent practice model. The researchers are trying to associate information and not determine a cause. By understanding more thoroughly the relationship of sensitivity and specificity of urine dipsticks and urine cultures to symptomatology and subsequent treatment for urinary tract infection in female clients, practitioners may more clearly recognize patterns of disease processes that require treatment with antibiotics and those that do not. Conducting the study retrospectively allowed the researchers to include in their population those women who received the standard treatment of symptomatology, examination, a urine dipstick analysis, and a urine culture rather than experimentally defining treatment groups.

This very technical but well-designed study has much importance in terms of current concerns of overuse of antibiotics and determining practice guidelines for urinary tract infection (UTI) treatment in the urogynecology population. Study objectives were clear and led the reader to the specific research design. However, the reader might be a bit surprised at the inclusion of specificity and sensitivity terminology because it was not discussed in the problem statement. Perhaps a brief explanation in the problem statement or the literature review would help the reader understand the terminology as it relates to subsequent findings.

A convenience sampling procedure was used without random selection. Although a power analysis to determine sample size is not evident, in order to represent the target population, usually a large sample size is needed. In the case of the current study, the sample size of 304 was more than adequate to produce a power of 0.8 and avoid the possibility of error in the study (Polit & Beck, 2008). Population inclusion criteria are thorough and easily understood, procedures are clear, and definitions of variables as well as specifying symptom variables are clear. The regression statistics for analysis fit with the intent of the study to predict whether individuals presenting with certain symptoms and receiving a urine dipstick would need a urine culture and the subsequent treatment with specific antibiotics. Tables were particularly useful and clear in presenting comparative sample population infor-
mation as well as logistic regression analyses. Thus, the integrity of the study is sound.

A thorough literature review of studies that were comparable and addressed similar variables was presented not only in the literature review section but throughout the discussion. As well as they could make comparisons to the current findings, the researchers related prior findings to their own. That becomes difficult, as noted by the researchers, because the studies do not consider all variables in a similar manner. The discussion and conclusions were very technical and required careful reading to develop good understanding of the findings. However, one does understand the findings as they are presented. A retrospective study by Grover and colleagues (2007) from the Mayo Clinic examined treatment of uncomplicated UTI. While urine dipsticks and urine cultures were performed on all clients, treatment was unchanged as a result of the urine culture. This study indicated that the evidence base supported that urine dipstick was sufficient in the uncomplicated population. The fact that the current study considered those who had recurrent UTIs may suggest different treatment guidelines for these different populations.

A final examination in this review is that of the use of logistic regression analysis. Regression analysis has typically been used in more complex research studies and provides credibility as a higher level of analysis of many independent variables with a dependent variable than do more simplistic analyses of one independent and dependent variable. Until recently, logistic regression analysis received minimal presence in research textbooks. Now, not only is it explained in depth in the texts, it is being used with greater frequency in research studies. It indicates the probability of an outcome with an odds ratio (OR) representing the occurrence (Polit & Beck, 2008). Surrounding the odds ratio (OR) that is the estimate of the probability of an outcome is a confidence interval (CI) within which the likelihood of certain odds or estimates will be contained (Polit & Beck, 2008). Some research journals require confidence intervals to be stated in the context of a research report so that clinicians can examine the accuracy of certain parameter estimates. The confidence interval allows readers to not only review one ratio, but 95 or 99 times out of 100, where the ratio will fall. Additionally, it says that the researcher is willing to be wrong only 5 times out of 100 or 1 time out of 100 (Burns & Grove, 2005; Polit & Beck, 2004, 2008).

Although more complex to understand, this statistical analysis is very appropriate for the current study. The logistic regression analyzed the probability that the sensitivity and specificity of the urine dipstick would eliminate the need for a urine culture such that a treatment decision could be made. Unfortunately, the researchers were not able to draw this conclusion. The researchers were very honest in their discussion of their findings and in their comparisons of their findings with other studies. Importantly, they determined that in spite of significant correlation between positive urine culture and urine dipstick, treatment decisions could not be made without the urine culture in this study population.

Application to Evidence Base

The Melnyk and Fineout-Overholt (2005) rating hierarchy places this research at Level IV of a seven-level hierarchy of evidence, indicating that it has good ability to contribute to the evidence base. It is the opinion of this reviewer that the internal validity of the study was sound and that the significance found is important and does provide information that is useful to clinicians. Although the researchers were not able to conclude that the urine dipstick analysis was sufficient for proper treatment of UTI in the urogynecology population, the evidence that the urine culture is still important to the diagnosis and treatment of UTI is important and may generate further research that will support future practice guidelines. Additionally, the information they learned about related symptoms that suggest infection lend themselves to client education opportunities by nurse and physician clinicians.

References


