

Using evidence to inform practice



1. Introduction

In order to adopt an evidence based approach within a clinical setting, sound critiquing skills are fundamental. Smith (1997) and Aveyard (2002) concur with this view noting that in the ever changing healthcare system, it is essential to continually research and review clinical procedures. Healthcare professionals with critical evaluation expertise will ultimately provide the highest quality of care when meeting the needs of patients (Melnyk 2004). This assignment aims to critically evaluate primary research articles, thus demonstrating knowledge and understanding of the research process. The subject chosen for this critical appraisal focuses on peripheral venous cannulation and the relationship between length of time in situ and the development of phlebitis. For the purpose of this critique, the framework of Parahoo (1997) has been used to assist in producing an organised sub-headed piece of work.

2. Background

According to Campbell (1998) 25, 000000 NHS patients per year are estimated to receive some form of intravenous fluid via a peripheral route using a peripheral venous cannula. Venous cannulas are inserted primarily for the administration of intravenous fluids, obtaining blood samples and administering medicines. However, there are complications associated with peripheral cannulation. As Horton and Parker (2002) indicate, these range along a spectrum of symptoms, most commonly phlebitis, but also other localised infections. Pearson (1996) believes the length of time a cannula is in situ is an important factor in the development of phlebitis, with the risk

increasing the longer the cannula is in place and recent literature has raised issues around the consensus of opinion regarding this.

3. Search strategy

The databases chosen for the literature search were CINAHL and MEDLINE as they contain a diverse range of medical and nursing journals. To establish the breadth of literature available, key words were used. Inclusion and exclusion criteria were applied to narrow the focus onto the specific topic. Then, with the criteria imposed, abstracts were screened to determine the articles' relevance. Furthermore, a critical appraisal tool (adopted from Hawker et al. 2002) was used to evaluate the studies in conjunction with a critical appraisal grid. It is important to utilise an appraisal tool to avoid reaching biased conclusions in instances where one may not agree with the findings. A copy of the search strategy and appraisal grid can be seen in the appendices section.

The papers selected for review were: Curran et al (2000), a research project aiming to reduce phlebitis; Homer (1998), which investigates the risks associated with cannula dwell times; and Lai Kwan Kew (1998), a study of the safety of prolonged cannula usage.

4. Critical review

4.1 Research aims and design

Identification of the purpose and type of research at the beginning of a paper has several immediate advantages and limitations. From a nursing perspective, it is possible to determine if the research is relevant to patients in a particular care setting. Thompson (2007) concurs with this view and

suggests that without a clear statement of aims the reader is unable to determine whether the research achieves certain objectives or not.

The aim and type of approach was clearly stated within the abstract or summary of all three papers. The studies all give a good definition of phlebitis and use severity rating scales. However, there is no apparent common indicator identified. For example, Lai (1998) has defined phlebitis as a palpable cord or at least two of the following, tenderness, warmth, erythema and induration. Yet, there is no particular reference as to the origin of the definition, although it appears to have been adapted from the inflammation scale used by the IV team within the hospital where the study took place.

The three studies were all described as prospective and nonrandomised. According to Woods and Catanzaro (1988), a prospective design aims to observe a sample on at least two occasions over a period of time, the aim being to reduce the likelihood of bias in reporting the relationship between the cause and effect. Whereas Lai's (1998) study consisted of gathering information for a period of one month and could therefore be called prospective, it is not clear whether all the criteria for a true prospective design were applied or not in Homer (1998) and Currans' (2000) studies. However, this is not to say that the research findings themselves would not be valid and reliable. Rather that even though there is a clear statement of the type of research, care must be taken that it does not influence personal judgement or the analysis of the study.

4. 2 Ethical issues

Considering ethical issues in research is important as there can often be conflict between the researcher's desire to help patients and to advance scientific knowledge (Batavia, 2001). None of the studies make any reference to ethical issues. Sim and wright (2002) state that "...for research where there is human involvement, permission should be sought from the relevant health authority...", however each of the studies fail to mention evidence of gaining ethical approval from any participant involved.

4. 3 Sampling

Lai (1998) and Homer (1998) have given clear indication of the type of setting for their sample. Curran et al (2000) has conducted a multi-centre approach that used surgical patients as the sample but there is no specific detail as to the type of centres included in the study. A weakness common to all of the studies is the lack of information regarding how the sample size was estimated. According to Polit and Hungler (1995), a sample size that is too small may fail to collect clinically important effects or differences. However, Polit and Hungler (1995) also point out that when non-probability samples are used, a large sample may not reduce bias.

Although there is a lack of information regarding inclusion and exclusion criteria for the sampling in all of the studies, Lai (1998) has briefly reported criteria for exclusion. The strength of Lai's (1998) prospective study lies in the apparent inclusion of all patients admitted during the month the research was carried out.

Homer's (1998) study is particularly unclear with sampling methods. For instance, the retrospective study collected data on 722 patients over a period of three months. Firstly, this appears to be a relatively small sample for such a period of time. Secondly, it would appear that patients may have been excluded if documentation was incomplete. This would limit the number included. However, these points were not discussed in the study.

Limitations with Curran et al's (2000) study concerns the lack of information regarding the type of centres used for the study. Although the sample was taken from surgical patients, there could be implications for transferability. For example, if the majority of the centres conducted minor surgical procedures as opposed to major surgery, the findings may not be representative of all surgical patients in general hospitals.

4. 4 Data collection, analysis and findings

All of the studies use tables or graphs to present descriptive statistics. These are accompanied by detailed written explanations of the findings. In particular, Lai's (1998) presentation is clear and it is possible to follow the analysis and verify the results. Homer's (1998) results are more difficult to follow despite full explanation of the results in the text. Curran et al (2000) has provided a table with the differences in variables between surveillance periods. However, there is lack of clarity with the sample numbers and there does not appear to be any explanation for this.

Each of the studies used inferential methods to analyse the data collected. For example, from estimating risk parameters from the data collected, Homer (1998) has used a chi-squared test as a measure of association in

order to test the hypotheses. However, the analysis becomes confusing with the use of risk models to further analyse the data. It is not possible to determine if the analysis is meaningful due to the complicated presentation of values. Firstly, without sophisticated manipulation of data, it would not be possible to obtain useful measures from the data collected as the distribution pattern was skewed. Secondly, the mean may not be a good measure of central tendency with an uneven distribution, depending on whether the data collected was for infiltration or phlebitis. Consequently, readers need to be aware that lack of knowledge and familiarity with this type of test has to be enhanced in order to understand the findings.

Lai (1998) uses Fishers Exact Test, which is an alternative to the chi-squared test for testing statistical significance between the two groups. As Polit and Hungler (1995) point out, Fishers Exact Test has the advantage that it is suitable for small sample sizes. Curran et al (2000) has analysed data using various non-parametric tests that are appropriate to what was being tested.

Findings from all the studies were similar. Lai (1998) acknowledges the limitations of the study and proposes that a randomised prospective study would be needed to confirm the findings. Homer (1998) reported his findings do not necessarily reduce the complication rate or the risk. The conclusion drawn by Curran et al (2000) recommend that there is no specific requirement to remove the cannula at seventy two hours providing there is no evidence of infection developing.

4. 5 Transferability

All of the studies used observation as the data collection method. Curran et al's (2000) study was multi-centred and involved thirty-nine data collectors. However, there is no discussion on the reliability level. Lai's (1998) study relied on an unspecified number of data collectors. Homer's (1998) retrospective study also does not mention who retrieved the data. Therefore it is impossible to ascertain whether it was carried out by more than one person. Another point to mention is that whilst the Wilcoxon Signed Rank test was used to test the difference in the ranks of scores of related groups there is no system noted to test the difference in the rank of scores of independent groups. In contrast, Curran et al (2000) appears to be the only study that has taken account of any confounding variables. Overall though, the studies have given detailed accounts of the tests used for analysis of data even if a little complicated for the intended reader.

4. 6 Implications

The lack of confounding variables in two of the studies (Lai 1998, Homer 1998) suggests limitations that may have an effect on the quality of the data collected and it's compatibility with other relevant evidence. Lack of clarity in Curran et al's (2000) study regarding the setting and the sample numbers raised concerns over generalizability. This review highlights the lack of consensus over clinical indicators and rating of phlebitis, which can lead to potentially serious implications for risk management and safe practice. Also, although it was not the prime rationale for the studies being undertaken, it has also shown that resource awareness and financial implications cannot be divorced from clinical practice.

5. Discussion

Rating scales were used in all three studies to determine the severity of phlebitis. The appropriateness of using a measuring tool has been demonstrated in earlier quantitative studies within the same field (Dinley 1976, Maddox and Rush 1977). However, there are limitations and weaknesses with the tools used in the studies under review. Both Lai (1998) and Homer (1998) have used tools that do not appear to have been used in previous situations and there is no report on a pilot study being rehearsed. Another point of concern is the implication that the severity of phlebitis could be measured on a scale designed to measure the presence and severity of inflammation. This may lead to confusion between rating phlebitis and inflammation. In other words, it is not certain that the tool actually used measured what it was supposed to measure. Homer (1998) referred to other studies before adopting a different set of clinical indicators in his scale. Consequently, phlebitis and infiltration were both graded as 2 using the same clinical indicators. The strength of Curran et al's (2000) measurement tool lies in the fact that it had been used in other studies. However, there is no discussion as to the validity or reliability of the tool.

6. Conclusion

The conclusions drawn from these three studies cannot be used to inform best practice without further exploration of the relevant literature. However, undertaking the review has highlighted the importance of critical appraisal of research studies before findings are applied to practice. From a nursing perspective, the review forces one to reflect upon current practice, assessments and documentation of what is considered to be a routine daily

task. In addition, conducting a critical appraisal of the studies for this review has highlighted areas for development. In particular, lack of understanding of some of the tests used for inferential statistics. On the other hand it has also raised confidence in appraising research studies, a skill which can continue to be developed and shared with colleagues.

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