

Critical care nurses and pulmonary artery catheter nursing essay



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Introduction

The use of the pulmonary artery catheter (PAC) and the care of the associated patients have been debated rigorously over the past two decades (Aragon et al., 1998). The knowledge of the nurses regarding the use of PAC has been the most important aspect of the debate and many researchers (Aragon et al., 1998; Iberti et al., 1994; Burns et al., 1996; Johnston et al., 2004; Parvianen et al., 2006) have tried to assess the knowledge potential of these nurses. These critical care nurses in care of the patients requiring the PAC support are responsible for “measuring, recording, interpreting and reporting hemodynamic data obtained from the PAC” (Aragon et al., 1998). The data collected by the nurses is an integral part of the clinical decisions that need to be made after the procedure, thus, it may affect the patient outcome. Therefore, the nurses’ knowledge regarding the PAC is essential for the patient care and level of knowledge needs to be obtained and understood for better standards of care in the future.

In 1994, the Pulmonary Artery Catheter Study Group published their research aimed at assessing the knowledge and understanding of the use of PAC in nurses. The main objective of the study was to understand the level of knowledge and understanding that a group of nurses, attending the American Association of Critical Care Nurses’ National Teaching Institute conference, possessed regarding the use of the pulmonary artery catheter and the measurement and interpretation of the data derived from it. The common use of the PAC and its effect on the patient outcome make it very important form of medical intervention that needs to be dealt with critical care. Positive effect on morbidity or mortality rates has made catheterization <https://assignbuster.com/critical-care-nurses-and-pulmonary-artery-catheter-nursing-essay/>

an issue of medical debate, thereby raising question regarding the use of the catheter and the understanding of its use.

There is no formal discussion regarding the design used and the strengths and weaknesses are not presented. The sampling approach is not clearly laid out, thus unclear in showing institutional or individual involvement, and the sampling method has not been affirmed. The justification of the selected group of critical care nurses has not been provided although reasons leading to sampling have been provided. Only 43% of the mailed nurses returned the questionnaires. The reasons for why some people chose not to take part are not given.

A pre-prepared 37-question multiple choice examination paper was mailed to the group of critical care nurses. The questionnaire tested the knowledge of the nurses regarding the use of pulmonary artery catheter. It can be seen that the questionnaires were mailed, thereby raising the chances of personal bias by the nurses without any supervision. The nurses involved were registered to attend the American Association of Critical Care Nurses' National Teaching Institute Conference. Out of the 37 questions, only 33 were analysed as the author deems the other 4 questions as ambiguous. Data analysis is clearly described and the measures taken to validate consistency of data have been mentioned. The various proven and established tests and methods have been used and mentioned as have been used in statistical analysis of data.

There is no justification for the selection of research method. A questionnaire does not seem to be a practical tool to be used in this particular study. Semi-

structured interviews with the nurses and clinical trials would have suited this study better as these would have provided realistic results about the understanding and use of the PAC. The researcher has not justified his relationship with the participants or the research process as a whole. The conception of the questionnaire is vague and does not necessarily depict the participation of the researcher. There is a general lack of ethical considerations in the study. The author fails to provide details of how the research was explained to the participants or the various issues that were raised by the study. There is also no prescribed approval from an ethics committee in the study.

The results are clearly stated and tables are neatly plotted detailing the characteristics, test and sub-test scores of the participants. Two-hundred and sixteen nurses completed the questionnaire and the mean test score was 48.5% and a range of 1 to 31. Test scores were significantly associated with the various characteristics of and relating to the nurses, which have been clearly stated. Validity of data has not been discussed.

There is an ample discussion about the findings and the results have been directly correlated to the research question. The author notes that a wide variation exists in understanding of the use of the pulmonary artery catheter and certain technical and educational reforms are required, which have been briefly discussed. The final few paragraphs state the limitations of the study and certain reforms have been suggested in order to improve the efficacy of the use of the catheter. The author fails to identify or state any future issues or opportunities that may arise from this study.

Critical Appraisal: Critical care nurses' knowledge of pulmonary artery catheters

The knowledge of the critical care nurses regarding the pulmonary artery catheters is examined. The research objective clearly states that the critical care nurses' knowledge of pulmonary artery catheters will be evaluated. A number of earlier studies indicate towards the knowledge deficit of the physicians and nurses regarding the pulmonary artery catheters. The use of catheters has been debated vehemently and the need for the catheters has been put under question due to various complications that arise with its use. The nurses have an important role in anticipating and managing complications, and collect data. This data has to be interpreted by the nurses and appropriate interventions have to be applied accordingly that eventually affects the patient outcome.

The research design has been easily stated. A descriptive, correlation design has been used in the research. The knowledge of the nurses regarding the PA catheter has been tested and demographic variables have been correlated with their knowledge scores. The sampling approach has been clearly stated including the institutional involvement of the participants and the demographic elements have been referred to. A nonrandom sampling technique has been used to select 168 critical nurses from 15 institutions. There is no discussion about the recruitment, and why some of the individuals chose not to participate has not been discussed.

A questionnaire was used to collect the information or data regarding the understanding of the use of PA Catheter by the critical care nurses. The questionnaire was the original used by Iberti et al., in 1994. Permission to <https://assignbuster.com/critical-care-nurses-and-pulmonary-artery-catheter-nursing-essay/>

use the questionnaire was obtained from Iberti. Two of the questions were removed from the original questionnaire and the reasons for doing so have been clearly stated. The purpose of the questions put forth is discussed briefly. The process of data collection is described very clearly. The examination was held under standardized supervision to reduce any chances of bias. 168 of the 170 participants completed the questionnaire. The reasons for the 2 participants being unable to complete the test have not been provided.

The ethical considerations have been duly followed by the researcher. Permission to conduct the study was obtained and the participation was voluntary. Additional participants were also recruited after prior permission of the conference sponsors. The researchers visited the institutions themselves to explain and conduct the study. The role of the researcher in collecting the data has not been cleared and it remains unclear as to what the role of the researcher was.

The results have been clearly put in the form of tables and a model. The measures taken to validate the data entry have been stated as well. The mean knowledge score was 56.8% correct with a standard deviation of 3.74. The range of the correct scores was put between 8 and 25. 39% respondents were unable to understand a pulmonary artery wedge measurement value from a waveform recording. The correlation was done and checked with more than one tool of correlation to make sure that the findings were accurate.

The discussion supporting the findings has been put forth in detail. The results have been compared to the physicians' score in Iberti's research. The discussion covers both the knowledge and lack of knowledge in the critical care nurses and has been stated directly in light of the research question.

The research ends with the author stating the limitations of the study before going on to provide necessary implications for practice. The various questions raised by the research study have been stated and further research is indicated. The research concludes by reaffirming the study of Iberti et al. (1994) and raising a question regarding the role of the medical fraternity in improving patient care.

Critical Appraisal: Survey of Intensive Care Nurses' Knowledge Relating to the Pulmonary Artery Catheter

The objective of this survey was to find out about the knowledge of the Intensive Care Nurses relating to the pulmonary artery catheter. There has been controversy and misgivings about the benefits of the PAC to the patients. In fact, the use of the PA Catheter has been linked to the increased rate of mortality in the patients. The main issues arise from the use of the catheter and the interpretation of the obtained data. There have seldom been research on this topic outside North America, thus, this study takes the previous studies forward in other parts of the world. The study is set to survey the knowledge of ICU nurses relating to the use of PA Catheter in a group of nurses in Australia.

The research design for the study does not present a formal discussion or any alternatives. The strengths and weaknesses of the research design are

consequently missing. The sampling approach has not been clearly put out and the justification for the selected sample has not been provided. The institutional and individual involvement is ambiguous and no discussion is provided around the recruitment. 139 nurses have been included from 5 ICUs. There was a response rate of 46.3%, but the author fails to provide a discussion in relation to why this happens.

A questionnaire was used to collect information regarding the knowledge of the nurses regarding the use of the PA Catheters. The questionnaire was devised by Iberti et al. (2004). The questionnaires were distributed with the help of the nurse coordinators and senior nurse coordinator. 12 other questions preceded the questionnaire. The institutions were given two weeks to complete the survey. The process of data collection is highly ambiguous and no information has been provided regarding the subject. The lack of supervision could have led to personal bias during the test/filling up the questionnaire. The role of the researcher in data collection is not clear. The survey was anonymous and the surveys were manually marked by the investigators.

For the purpose of the use of the questionnaire in the research, the authors of the original questionnaire were contacted to obtain the consent regarding the use of the same. In case of the institutions, an ethics committee application proposal was drafted and sent to each institution and prior approval for the survey was sought. Before the questionnaire, a general information sheet was sent with information regarding the background and the purpose of the study.

The analysis of data is coherent and transparent. The values were presented as mean \pm standard deviation. Comparisons were accompanied by univariate analysis of variance and Spearman's rank correlation coefficient. Software, Statistical Package for the Social Sciences, was used for the data analysis.

The data has been plotted effectively in tabulated form signifying varying results in various tables. With a response rate of 46.3%, 42.8% correct average mark was noted. 71% of variance in test scores was accounted for by the model. The analysis process has not been described efficiently and the findings are not supported by any tests that confirm the validity of the findings. The detailed discussion focuses on the contradictory data and the comparison of the findings with earlier studies. The findings have been discussed in light of the research question but the analysis of data is highly unclear.

The last few paragraphs emphasize regarding the wide variation of nurses' knowledge of the PAC as reflected in earlier studies. Implications for the future have been discussed but the limitations of the study have not been stated. Moreover, the issues created by and surrounding the study have also not been demonstrated.

Critical Appraisal: Practical sources of error in measuring pulmonary artery occlusion pressure

The research sets out to emphasize on the errors obtained in measuring the PA occlusion pressure. The aim of the study is to assess the errors that are related to the technical aspects and actual measurement of the PA occlusion

pressure. The use of the PA catheter has come under a lot of controversy, with some of the studies pointing out that it is not even helpful for some of the patients. One of the main issues that arise with the use of PAC and that can prove fatal to the patients is the correct measurement and interpretation of the data, i. e. pulmonary artery occlusion pressure (PAOP). The study aims at evaluating the agreement on the current position of pressure transducers and on the point at which PAOP should be determined on monitor PAOP tracings amongst practicing physicians and nurses working in intensive care units (ICUs). The importance of doing so has not been emphasized enough in the opening paragraphs.

No formal discussion of the research design is given, and no alternative provided. There are no weaknesses and strengths of the design mentioned. The researcher fails to justify the research design and does not discuss how the method of use was decided upon. The sampling approach is not given and no institutional or individual participation is coherent. The selection seems to be purposive, which may lead to a general selection bias. 47 participants on the first and second inter-Nordic intensivist training program for anesthesiologists coupled with 22 nurses from the department of Intensive Care were tested.

The data was collected using a questionnaire and trials where the participants were tested without any pre-announcement. There is no information regarding the devising of questionnaire or assessment criteria. The statement of step by step method is clear, but no definite method of data collection has been pointed out. The procedure was divided into two tasks: setting up pressure measurement system for PAC (zeroing and <https://assignbuster.com/critical-care-nurses-and-pulmonary-artery-catheter-nursing-essay/>

reference level) followed by measuring the PAOP. No justification for either is provided. The role of the researcher in the study has been undermined without any provided justification.

The participants had received a teaching package regarding hemodynamic measurements 2 to 3 weeks before the course on intensive hemodynamic monitoring. The researcher thinks that the Ethics Committee approval was not necessary for the study and the necessary reasons have been provided. It is felt that with the inclusion of patients in the trial process, ethical considerations might have been necessary to keep the integrity of the study intact. No issues surrounding the study that may have come up have been addressed.

There is no in-depth description of the analysis process and it is not clear if any themes emerge out of the given data analysis. No mention is made of the level of significance used, and it can be assumed that the researcher was working at a 10% level. No specific tests have been used or stated to validate the data or check it for consistency. No absolute correct values were defined.

Data has been presented as median (range) and tables and charts have been used to depict the data. The median difference from the reference mid-axillary zero level was -3cm for physicians and -1 cm for nurses. The same difference from median PAOP was 0 mmHg for physicians and 1mmHg for nurses. After the adjustment of differences from the reference transducer level, the median differences from the reference PAOP values were 2mmHg for physicians and 2mmHg for nurses. Adequate discussion follows the

results but the findings somehow were not discussed in relation to the research question throughout.

The final paragraphs try to identify the limitations of the study before concluding that comparison of results between ICUs or practitioners is not feasible without prior validation. The author states that measurement of pulmonary artery occlusion pressure is susceptible to errors due to practical mistakes. The author also suggests continuous medical education instead of a brief educational program to improve the interpretation of PAOP tracings amongst physicians or nurses. The researcher fails to identify new areas where the research may be useful or how it may benefit the existing research or field of practice.

Discussion

Pulmonary artery catheters (PACs) have been used in clinical practice for a number of decades now. Developed to gauge the hemodynamic status of the critically ill and seriously injured patients, the technology was introduced without considerable testing for safety and efficacy (Frazier and Skinner, 2008). The use of PA Catheters has come under scrutiny in the last two decades (Aragon et al., 1998). The lack of knowledge of nurses and physicians towards using the PA catheters has been reported in a number of studies (Iberti et al., 1994; Burns et al., 1996; Johnston et al., 2004; Parvianen et al., 2006). The critical care nurses have been known to be typically responsible for the use of the catheter and measuring and interpreting the data (Aragon et al., 1998; Iberti et al., 1994). As this data is used to make clinical decisions that may affect the patient outcome (Aragon et al., 1998), it is important to make sure that there is a clear understanding <https://assignbuster.com/critical-care-nurses-and-pulmonary-artery-catheter-nursing-essay/>

of this data and that there is knowledge about the perfect way to do it (Keckeisen 2004).

To assess the knowledge of the nurses and physicians in respect to the use of the pulmonary artery catheter has of great interest to a number of researchers. Iberti et al. (1994), one of the earliest PAC study groups, researched using a questionnaire and questioning more than 200 critical care nurses regarding the use of the PAC to get an understanding of the knowledge possessed by the nurses. Iberti et al. (1994) found a wide variation in the understanding of the use of PACs among nurses using the device in care of patients. One of the interesting things that came up in the study was the significant association of the findings with the various characteristics of the nurses in question, e. g. CCRN certification, experience in critical care, frequency of use, and responsibility for repositioning and manipulating the catheter (Iberti et al., 1994).

In a similar study, using the same questionnaire, Burns et al. (1996) affirmed that the knowledge of the critical care nurses regarding the PA catheters was related directly to the frequency of their exposure to the catheter and critical care nursing experience. The other factors that affect the knowledge of PACs are: attendance at a pulmonary artery catheter class and Critical Care Registered Nurse Certification. While mean knowledge score recorded by Burns et al. (1996) was 56.8%, Iberti et al., (1994) measured it at 48.5%. It can be seen the knowledge levels of these nurses in such an important medical procedure is not sufficient or impressive. Even the physicians recorded a 67% correct test score (Iberti et al., 1994). This signifies a lack of knowledge regarding the pulmonary artery catheter.

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Johnston (2004) researched with the questionnaire prepared by Iberti et al. (1994) to find a 42.8% correct knowledge in intensive care unit nurses. The knowledge score was significantly associated with the registered nursing level, frequency of supervision of PAC per month; self assessed knowledge and experience in the ICU (Johnston 2004). It is seen that with the increase in variables, there is a usual increase in the knowledge score.

Parvianen et al., (2006) stated that the data obtained by PAC was highly susceptible to errors in measurement and interpretation. Over the years of research that has been dedicated to the study of PAC, little attention has been paid to the relevance of discrepancies in measurement and interpretation of the collected data (Parvianen 2006). Parvianen stated that “ measurement of the PAOP is susceptible to substantial error as a result of practical mistakes” (Parvianen 2006).

Aragon et al. (1998) found in their study that critical care nurses demonstrated a good understanding of general PAC use and the clinical application attached to it. But, in terms of interpretation of the collected data and the measurement techniques, there was a knowledge deficit. The quality of PAOP measurement can be improved by maintaining continuous medical education as opposed to individual educational programs, which do not necessarily improve the interpretations of PAOP tracings in nurses or physicians (Parvianen 2006). Aragon et al. (1998) also supported the statement by recommending formal and standardised education of critical care nurse in charge of caring for the patients with a PAC.

Iberti et al. (1994) suggested CCRN certification as an essential component for credentialing nurses to use the pulmonary artery catheter. “ Small hospitals and hospitals that employ the device infrequently should take immediate measures to ensure a level of competency similar to that of larger institutions with more frequent usage” (Iberti et al. 1994). Burns et al., (1996) on the other hand, suggested critical care educators to determine the requirements of their staff related to PAC education. PAC classes were suggested in case of major deficiencies. “ Minimum PA catheter knowledge scores should be established to qualify critical care nurses to care for PA catheter patients. On specific test states correct answers should be required for PS catheter certification” (Burns et al., 1996).

Conclusion

There are many factors that concern the critical care nurses’ knowledge of the pulmonary artery catheters. The research shows that this knowledge is directly related to CCRN certification, critical care nursing experience, frequency of nurses’ exposure to it, and self assessed adequacy of knowledge. Various reforms and measure are suggested to enhance the knowledge of the critical care nurses in regard to the use of PACs.

There is a knowledge deficit regarding the use of PA catheter in nurses and physicians. As the critical care nurses are responsible for the use, maintenance, measurement and interpretation of PAC and data related to PAC, it is very important that the nurses should have the adequate knowledge when looking after a patient who requires PAC. It is noted that in some cases where even if the nurses are able to demonstrate knowledge

regarding the use of PAC, there are discrepancies in measurement and interpretation of PAOP.

It can be concluded that the patients do not receive appropriate treatment and there is an urgent need to analyse and devise methods to educate and train the critical care nurses who work with the pulmonary artery catheters. Additional large scale research is required to validate the findings and determine if the knowledge of the critical care nurses is sufficient to maintain quality standards, safety of the patients and provide optimal patient care.