



Disposable versus Reusable Blood Pressure Cuffs: A Nursing Led Initiative

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Abstract

Background: In 2009, a large academic hospital spent \$310,000 on disposable blood pressure cuffs. Identifying this cost issue as a problem, the Director of Value Analysis submitted the problem to a nurse led group, the Nurse Practice Congress (NPC), for resolution. Within the NPC, nurses voted to accept the opportunity and commit to explore evidence based avenues to reduce costs.

Methods: Plan, do, check, and act were utilized as the primary method for this value analysis project. A nursing lead interdisciplinary team initiated a quality improvement project answering the question, "Can the hospital incorporate re-usable blood pressure cuffs in the place of disposable cuffs and decrease overall costs?" A literature search was conducted regarding the use of disposable equipment into the project. The amount of money spent on reusable and disposable blood pressure cuffs was used to gauge the success of the project. The amount spent was collected from 2009-2013 and analyzed to see if there had been a successful practice change within the hospital system.

Main findings: A literature search discovered with proper cleaning reusable equipment was appropriate for use in non-acute areas. The team recommended disposable blood pressure cuffs remain in use within intensive care units or areas where immune compromised patients were frequently admitted. Disposable blood pressure cuffs remained accessible to all nursing staff to be used for isolation patients or per nursing judgment. In 2009, the hospital spent \$309,835 on disposable blood pressure cuffs. The following years were as follows: 2010: \$292,959, 2011: \$193,021, 2012: \$251,647, and 2013: \$222,447. This is a cost savings over four years of \$277,266.

Conclusion: The result of this nursing led initiative was extremely lucrative for the hospital and within guidelines of evidence based practice. The collaborative team that discussed the issue and examined the literature, and reached a collaborative solution included main stakeholders throughout the hospital.

Keywords: Blood pressure cuffs; Cost of reusable equipment; Disposable blood pressure cuffs

Introduction

Most hospitals in the United States of America have easily understood policies and procedures in place to protect the patient from nosocomial infections and cross contamination between patients. The use of disposable equipment has become commonplace in larger institutions where patient flow is extremely high. Disposable blood pressure cuffs are used per patient and discarded after a single use. In 2009, a large academic medical center asked the question, "Can the hospital incorporate re-usable blood pressure cuffs in the place of disposable cuffs and decrease overall costs?" The question was sent to a nursing led group called the Nursing Practice Congress (NPC) for a solution.

Use of Equipment in the Hospital Environment

Hospital environments have received attention and criticism related to the spread of infection within their walls [1]. Disposable equipment, which results in substantial hospital per patient cost, has been identified as a potential vehicle for disease transmission [2]. A literature search using PubMed, Medline Database, and CINAHL

discovered published studies regarding the use of equipment (disposable and reusable) and nosocomial infection. A Google and Google Scholar search looked for any other materials that might yield unpublished results related to the use of reusable and disposable equipment. Key words used in the search were blood pressure cuffs, disposable equipment, reusable blood pressure cuffs, and hospital equipment. The literature search yielded a systematic review and two studies that specifically addressed blood pressure cuff usage.

Schabrun and Chipchase [3] identified 50 studies during a systematic review that sought to determine if healthcare equipment was a source of nosocomial infection. Twenty-seven of the studies were excluded and of the 23 remaining studies 11 examined levels of contamination and 12 measured the direct effect of cleaning agents. Two of the 23 studies reported uncleanness less than 70%. Interestingly, the numbers of pathogens was reported to be significantly reduced, not by detergents or expensive wipes, but with alcohol [3].

Blood pressure cuffs were specifically discussed within two studies. The first study was performed within a rural emergency department that has an annual patient census of > 35,000. The samples were collected randomly twice from blood pressure cuffs and pulse oximeters. Fifteen blood pressure cuffs were tested and culture growth after 48 hours yielded only mixed skin flora (saprophyte). A control

cleaned with alcohol yielded no growth [2]. The second study included 24 blood pressure cuffs from various wards throughout a hospital in the United Kingdom. Of those sampled 14 yielded contaminants with a recognized pathogen count of less than 200 cfu / 100 cm. This study recommended expanding disposable equipment because it takes time to clean them and time is an issue [1].

A query was sent out through the University Health Consortium (UHC) asking one question, "Do you have a policy for the use of reusable and disposable blood pressure cuffs within your facility?" The query received 13 responses all which stated there was no written policy for the use of this equipment. The response was unexpected since blood pressure cuffs are standard equipment throughout the healthcare continuum. No national standard for the use of this equipment was located, meaning each hospital system decided how and where reusable and disposable equipment was allocated.

Methods and the Collaborative Group

Our nursing journey

Nursing can lead the way in making hospital environments more cost effective. As patient advocates, nurses should have input into the type and utilization of patient care equipment. The question of using disposable and reusable blood pressure cuffs within a 946 bed academic hospital was presented to the NPC as a cost saving project for the hospital.

The NPC is comprised of staff nurse representatives from all areas within the hospital as well as nursing leadership representatives. Clinical issues are presented to NPC for consideration of a resolution and upon acceptance by NPC via vote, a PACT is formed. A PACT is a nursing lead interdisciplinary team comprised of key stakeholders identified through systems analysis of the specific issue being addressed. The NPC is the larger hospital group, while the PACT is a smaller work group. A PACT allows key stakeholders to meet and find common solutions to be presented back to the congress for approval. In 2009, the director of value analysis presented the issue of reusable and disposable blood pressure cuffs to the NPC where it was accepted and voted into a PACT for resolution. Blood pressure cuffs were chosen by the director of value analysis because of the large hospital expense created by the purchase of disposable cuffs. The blood pressure cuff PACT, led by a NPC staff nurse representative, was comprised of the directors of value analysis and environmental services, the nurse managers from the emergency department and endoscopy unit, six staff nurses representing a variety of areas within the hospital, an infection control nurse, and the NPC co-chair.

The interdisciplinary team established plan-do-check-act as the methodology for the quality improvement project. A literature search was conducted and the results reviewed by the PACT. Based on the findings, the PACT outlined the following four steps. First, in order to standardize the blood pressure cuffs, the hospital moved to a two tube blood pressure cuff system thus allowing disposable and reusable blood pressure cuffs to be interchangeable with existing blood pressure monitoring systems as needed per patient needs.

Secondly, the PACT decided to utilize reusable blood pressure cuffs throughout the hospital system excluding high acuity units and units with immunocompromised patient populations due to the existence of pathogens and the risk for infection though improperly cleaned blood pressure cuffs. Also addressed were the nurse's individual practice judgments regarding patients that needed disposable cuffs.

Recognizing the need to allow for nursing judgments, the PACT determined disposable equipment would remain available as needed for patient care. Finally, the PACT created extensive education on how to clean reusable blood pressure cuffs based on the evidence that proper cleaning would primarily eliminate pathogens.

The PACT presented the four steps as a resolution to the NPC. The NPC voted to enact the plan for resolution and the project was successfully piloted within several nursing units. The areas identified showed increased cost savings within the pilot. The proposed decrease in spending for the next year would be 270,000 dollars with strict adherence to the policy. After reviewing results of the pilot, NPC initiated the plan throughout the hospital.

Results

Return on the investment

The results of this project yielded a cost savings for the hospital throughout the next several years. During this time the hospital increased from 946 beds to 1157 beds and still yielded a cost savings in the use of blood pressure equipment. The amount spent on disposable equipment was reduced, saving the hospital \$277,266 within the next four years. The actual reoccurring savings is seen within the individual areas, some of which reduced cost on disposable blood pressure equipment to zero.

Within the Table 1 below sustainable cost savings can be seen. The cost savings is considerable after the changes were instituted in 2010. An increase in cost can be seen within some areas in 2012 and 2013 however cost remains substantially less than reported as baseline. Nursing units # 1 and 2 are both acute care units showing a cost reduction at times to zero. Nursing units # 3 and 4 are pre and post procedural areas which initially showed a substantial decrease and then a slight increase. Nursing unit # 6 is a post-operative area and has a steady decrease in cost throughout. Nursing unit # 5 is a procedural area that showed cost reduction from over 20,000 dollars to fewer than 1,000 dollars.

Nursing Unit	2009	2010	2011	2012	2013
#1 Acute care unit	\$3371	\$4881	\$0	\$701	\$417
#2 Acute care unit	\$12580	\$7602	\$0	\$0	\$0
#3 Pre Procedural	\$15079	\$15118	\$6,458	\$8435	\$10861
#4 Post Procedural	\$37904	\$27175	\$8,203	\$13715	\$12114
#5 Procedural	\$20235	\$15544	\$381	\$166	\$694
#6 Post-Operative	\$10,325	\$8,565	\$6,180	\$1145	\$576

Table 1: Sample areas within differing parts of the continuum of care and costs associated with disposable blood pressure cuffs.

These results are substantial related to the slight change in practice regarding the use of blood pressure equipment. The hospital remained in support of nursing judgments and the use of reusable or disposable equipment, creating a best practice environment.

Limitations of the Project

While this project produced increased cost savings, it is limited in that infection prevention data was not examined within the data set. The hospital tracks infection prevention data has an infection prevention department and an infection prevention nurse was participatory within the PACT. The hospital has not reported an outbreak of disease vectors related to reusable blood pressure cuffs over the last three years. This project is a cost analysis of the changes instituted with a policy related to blood pressure cuffs, and did not analyze other disposable/ re-usable items.

Discussion

With the institution of multiple changes in the healthcare system, cost analysis of equipment usage should be increased. Cost savings and the use of reusable equipment not only yield cost savings but also reduces medical waste. Elimination of medical waste is a cost concern and an environmental issue. In an article published within the AORN Journal, medical waste is identified as approximately twenty percent of a hospital's environmental budget [4]. The usage of reusable equipment or the reduction of disposable equipment is an area for more investigation and research.

Conclusion

The result of this nursing led initiative was extremely lucrative for the hospital and within guidelines of evidence based practice. The

collaborative team that discussed the issue, examined the literature, and reached a collaborative solution included main stakeholders throughout the hospital. The project maintained best standards by utilizing disposable blood pressure cuffs within immunocompromised and acutely ill patient populations, and utilized reusable blood pressure cuffs in areas of less acuity.

Best practice requires cleaning and maintenance of reusable equipment [5,6]. Reusable equipment when properly utilized can be introduced within the hospital continuum resulting in cost savings.

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