Aug 23rd, 9:00 AM

Surgical Smoke Evacuation Compliance: Barriers and Strategies Used Among Perioperative Nurses

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Background

- 500,000 perioperative staff members are exposed to surgical smoke each year – 100,000 of which are perioperative nurses
- Smoke content: vapors/ particulate matter, viable/ nonviable cellular material, bacteria, viruses and toxic gases
- Plume has been likened to that of cigarettes because it contains CO, HCN, and toxic amounts of toxoids and other chemicals
- Other risks: hypoxia, eye irritation, dermatitis, anxiety, leukemia, HIV and blood borne infections

Problem

- No definitive OSHA guidelines for local exhaust ventilation (LEV) or proper PPE (N95 mask)
- Rate of compliance to evacuation procedures and PPE use have reported use of as low as 11 percent and 3 percent, respectively
- Reported compliance rates of this nature are extremely problematic and pose significant health risk to perioperative nurses
- In an effort to bring these numbers at or near 100 percent, it will be necessary to determine the current barriers and strategies used to increase compliance rates among this population

Purpose

The purpose of this study was to examine the lack of compliance with the recommendations for evacuating smoke during surgical procedures amongst perioperative nurses. In order to understand this phenomenon, this study assessed the possible reasons for non-compliance by looking at the barriers, or strategies used, to increase surgical smoke evacuation procedure compliance.

Research Question

What were the possible barriers, or strategies used, to increase surgical smoke evacuation procedure compliance among perioperative nurses?

Methods

Design: This integrative literature review guided by Kurt Lewin’s Change Theory examined the possible barriers and strategies used to increase adherence to surgical smoke evacuation guidelines among perioperative nurses.

Literature Search Strategies: The databases used were CINAHL, PubMed, and ProQuest. The search terms included: surgical smoke evacuation, plume, electro-surgery, laser, diathermy, adherence, compliance, guidelines, protocols, occupational standards, policy, procedure, perioperative, inter-operative, barriers, strategies, and nursing.

Literature Search Inclusion Criteria:

- Published between 2008 and 2018
- Document barriers OR strategies used to increase surgical smoke evacuation compliance
- Focus on perioperative nursing implications

Results

Barriers (Restraining Forces): surgeon refusal, distractibility of equipment, lack of equipment

Strategies (Driving Forces): education, management support, ease of use/ easy to follow guidelines

Table 1: Summary of Studies on Surgical Smoke Evacuation Compliance

<table>
<thead>
<tr>
<th>Study</th>
<th>Study Design</th>
<th>Population</th>
<th>Description</th>
<th>Results</th>
</tr>
</thead>
</table>
| Study A | Case Study | Perioperative Nurses | Surgical Smoke Evacuation | Increased adherence
| Study B | Survey | Perioperative Nurses | Surgical Smoke Evacuation | Decreased adherence
| Study C | Interview | Perioperative Nurses | Surgical Smoke Evacuation | Increased adherence

Discussion

Surgeon refusal was the most commonly mentioned barrier to compliance and often nurses were conflicted with distraction and lack of equipment. Reasons for surgeon refusal included distraction, unavailability of equipment, change anxiety, lack of knowledge, and concern over a negative impact on the surgery. The reason that surgeon refusal seems to such a large barrier to change could be a direct result of the strict hierarchies that are followed in the operating room where surgeons are at the top. This sort of hierarchy is found throughout the health care field, some of which is taught directly in nursing school. Nursing students are taught that when there is a problem, there is a chain of command that must be followed. This is similar to the chain of command found in the operating suites, which may block other surgical team members from feeling like they can initiate the necessary changes to become smoke free.

Of the three strategies gathered from the literature, both education and management support were mentioned equally as often and seem to go hand in hand in terms of fostering positive change. It is often a lack of understanding or a fear of the unknown that blocks change from occurring. By educating perioperative nurses about the hazards of surgical smoke and the proper evacuation equipment, they can become empowered agents of change that will break through both group conformity and individual resistance to change. Those in leadership or managerial positions are the role models of the unit and whether they know it or not, those who are under their supervision look to them when deciding how to conduct themselves.

Nursing Implications

Nurses must push for a national surgical smoke evacuation standard from OSHA. It is important for nurses to know that they have the right to a safe and health work environment.

Nurses and the hospitals that employ them should be aware of the AORN go-clear award. This recognition program awards hospitals for a smoke-free environment based on education, evacuation compliance and sufficient equipment. Securing this award should be a priority for the following reasons:

- It helps to protect the surgical team and its patients
- It brings in and leads the best graduates due to the attractive work environment
- It increases surgical smoke evacuation compliance due to education

Conclusion

This integrative literature review has shown that the most frequently mentioned barriers to surgical smoke evacuation compliance are surgeon refusal, distractibility of equipment and lack of equipment. These restraining forces have the power to deter or even prevent change from ever occurring, as shown by the current level of compliance reported from previous literature. Although the strategies used to increase smoke evacuation compliance are still in their infancy stage of development, the increase in education, management support, and ease of use have played a key role in the few successful smoke free implementation programs.