The Design of a Sterile Product Laboratory Module as Preparation for an Institutional IPPE Course

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The Design of a Sterile Product Laboratory Module as Preparation for an Institutional IPPE Course

Abstract

Objectives: To develop a pharmaceutics laboratory module on compounded sterile products for the second year pharmacy students as preparation for an institutional pharmacy experiential course. Method: A 5-week lab module was designed and implemented as part of the Pharmaceutics Lab Course to provide training in the basic skills of sterile product compounding. The module included techniques in the handling of sterile products, aseptic techniques, medium risk products, and hazardous products. A practical exam was given at the end of this module to ensure student competency. Upon completion of the lab module, students enrolled in a required 4-week institutional pharmacy experiential course (IPPE-2), where students were required to compound a minimum of 10 sterile products. Students were then asked to participate in a survey assessing the effectiveness and relevance of the lab module as preparation for their IPPE-2. Results: The sterile product lab module was offered in the spring semester with 75 students enrolled. All students passed the sterile product lab module and continued onto the IPPE-2 course during the following summer. The student survey indicated that the students felt well prepared for the IPPE-2 and that the preceptors were satisfied with their prior training in sterile compounding. The average scores ranged from 4.8 - 6.5 (scale of 1-7) for the various products addressed in the lab module. Implications: The 5-week sterile product lab module progressively prepares the students with the basic skills and knowledge in compounding sterile products. This preparedness allows the students to transition smoothly into the subsequent institutional pharmacy experiential course.

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Comments
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At WSOP, sterile product preparation is a required learning objective for the second year pharmacy students as preparation for an institutional pharmacy experiential course. A number of students requested and were given extra lab practice. The preparations from this lab module allow the students to practice handling of sterile products, aseptic techniques, handling of hazardous products, and IV bags. This is hard, because many sites have their own policies and procedures.

The students prepared two sterile products during each lab. Due to space limitation, students prepared only one product in a laminar flow hood. Working in the hood is a main teaching lab. The bench was taped at 6 inches from the edge to mimic the horizontal laminar flow hood. Figure 1. A student getting ready to prepare an IV admixture in a horizontal laminar flow hood.

CONCLUSIONS AND IMPLICATIONS

- The 5-week sterile product lab module progressively prepares the students with the basic skills and knowledge in compounding sterile products.
- The preparations from this lab module allow the students to transition smoothly to the subsequent institutional pharmacy rotation.
- The students are able to focus on higher level experiential learning objectives during the rotation than basic compounding skills.

RESULTS AND DISCUSSION

- The sterile product lab module was offered in the spring semester of 2008 – 2010 with 53 – 75 students enrolled each semester. All students passed the sterile product lab module and continued onto the IPPE-2 course during the following summer.
- A number of students requested and were given extra lab practice sessions to improve their compounding skills prior to the lab practical. An extra week has been scheduled for this lab module in 2012.
- For the 2010 lab course evaluation (scale of 1 – 7), the average student rating was 6.42 for “The course objectives were met” and 6.45 for “I’m able to accurately compound a medication product”.
- A group of nine students were surveyed after the IPPE-2 rotation in 2010. These students indicated that they felt well prepared for the IPPE-2 (score 6.57 out of 7) and that the preceptors were satisfied with their prior training in sterile compounding (score 6.43 out of 7). These students also provided written feedback for the two questions shown below. Selected answers are included after each question.

- What aspect of the sterile product lab module was most beneficial to you during IPPE-2?
  - Have videos for review
  - Consistency in sterile techniques
  - Gowning practice for every lab
  - This is hard, because many sites have their own policies and procedures.

- How can the lab module be improved in the future to prepare students for IPPE-2?
  - More practical, hands-on experience
  - Use of syringes and IV bags
  - The techniques and the rationale behind them
  - More experience

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Students practicing sterile product compounding using horizontal laminar flow hoods in a simulated clean room.

Figure 2. Students were given a demonstration on the use of an automated compounding machine to prepare a TPN product, an example of medium risk level products.

Figure 3. Students preparing products in the main teaching lab. The bench was taped at 6 inches from the edge to mimic the horizontal laminar flow hood.

Figure 4. Students practicing sterile product compounding using horizontal laminar flow hoods in a simulated clean room.

Table 1. Lab Design and Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lab Design and Schedule</th>
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| Week-1 | - Basic techniques on handling needles, syringes, ampules, vials and IV bags.  
|         | - Techniques to reconstitute solid products and transfer liquids.  
|         | - Proper labeling of compounded sterile products                  |
| Week-2 | - Proper use of the laminar flow hoods and aseptic techniques.  
|         | - Selection of compatible diluents or vehicles based on proper reference materials. |
| Week-3 | - Preparing a parenteral nutrition product – an example of medium risk level products with potential incompatibility issues among additives.  
|         | - Demo of automated TPN compounding                               |
| Week-4 | - Precautions and techniques for handling hazardous products      
|         | - Practicing gowning procedures                                   |
| Week-5 | - Lab practical (two products)                                   
|         | - For one product, students were evaluated individually for their compounding techniques by TAs or faculty volunteers |