Technique to open an ampoule with an “Ampoule Opener” tool
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INTRODUCTION

The procedure to open an ampoule is a somewhat risky procedure that can cause injury to the hand1. There have been quite a lot of cases of hand injury in the case. The result of interviews in the emergency room and the inpatient rooms in Ajibarang Hospital showed that almost all nurses had experienced scratches as they were opening the ampoule-- especially in their initial period of working as a nurse. This fact supported previous studies where the incidence of scratching when opening the ampoule is very significant. The highest incidence rate reaches 90.3%, and 37.6% tend to be repeated, namely experiencing injuries more than once2–4.

Lack of skills, no specific training, and the absence of special tools to open ampoules are among factors that cause the accidents on the nurses5. There are various standard techniques to do, including using hands manually, a syringe cap, gauze, cotton balls, and even a plastic syringe6. Research on the innovation of ampoule bags as prevention of work accidents had been carried out. To this effort, most respondents considered the ampoule bag to be more effective in preventing injury compared to gauze. However, some respondents thought it was impractical7.

Some ampoule opener tools have been developed. One of them is shaped like a clamp/tweezers with a round hole inside4. Another study designed a tool using a rubber ring3. The results of these studies were equally positive. The use of these tools to open an ampoule reduced the arm's workload and the scratching injuries. The present research designed an opener called an “ampoule opener” in the shape of a tube with a hole at the outside, made in various sizes to break the ampoule head. This study aimed to compare the ampoule opening technique using the developed “ampoule opener” and other available techniques.

TECHNIQUE

Technique 1. How to Open Ampoule Manually/Without Any Tool

Steps to open the ampoule manually/without any tool is 1) Hold the ampoule tube in the left hand, and grasp its head in the right; 2) Break the head by turning it inward or outward, as shown in (Figure 1).
**Technique 2. How to Open the Ampoule With Gauze**

Steps to open the ampoule with gauze is 1) Hold the ampoule; 2) Take the gauze and fold it over the head of the ampoule; 3) Break the ampoule inward or outward, as shown in (Figure 2).

**Technique 3. How to Open the Ampoule With the Syringe Wrap**

Steps to open the ampoule with the syringe wrap is 1) Hold the ampoule; 2) Take the wrapper and fold it over the head of the ampoule; 3) Break the ampoule inward or outward, as shown in (Figure 3).

**Technique 4. How to Open the Ampoule Using the “Ampoule Opener” Tool**

Steps to open the ampoule using the developed ampoule opener is 1) Insert the ampoule head into one of the holes according to its size; 2) Break the ampoule by turning it forwards or backward; 3) Discard the broken head in the safety box, as shown in (Figure 4).

**Video 1. The technique to open ampoules using “Ampoule Opener” tool than the other techniques**

(Use Adobe Flash Player to view videos)
DISCUSSION

Firstly, this research was done by designing an ampoule opening device, labeled as the “ampoule opener.” It is a tube made of wood, with several holes with different diameters as the holder of various-sized ampoule heads. It was designed ergonomically for an easy-use. The way to use it is straightforward. We only need to insert an ampoule head into one of the fitting holes (holder), then turn the opener to the front or back-forth quickly, and then it is done. The broken head will fall into the tube for discarding, as shown in Figure 4.

The ampoule opening techniques were carried out in February-April 2020 with 100 nurses in the health science faculty laboratory, Muhammadiyah University of Purwokerto, and at the Ajbarang Hospital. All the nurses were asked to open the ampoule using techniques 1-4 alternately. The ease and safety of opening the ampoule were observed and asked all respondents. The results showed that all the respondents considered opening an ampoule using the ampoule opener (Technique 4) was more comfortable and safer than the other techniques.

An ampoule is a cylindrical glass container for intravenous solutions; it consists of three parts - the head, neck, and body. The head is marked with a dot to identify the direction to press the neck for opening. The indentation in the neck just below the dot makes the ampoule easy to open. The neck must be broken by hand to access the intravenous solution contained therein; this operation sequence is referred to as ampoule opening. The process of opening the ampoule without a tool can be rough and shaky; the medicine inside can be spilled or even contaminated by small glass shards and can also injure the hand. This ampoule opener can help the ampoule open easily. It can guide the pressure in the correct direction, thereby reducing the chance of injury from broken glass. The technique to open ampoules using this tool is much easier than doing it manually (Video 1). All the respondents revealed that using this tool is easier to do than manually or only with the gauze and syringes. They also thought that it reduces the risk of being scratched.

CONCLUSIONS AND RECOMMENDATION

The technique of opening the ampoule using the “ampoule opener” is proven to be comfortable and safe compared to others. Nurses are expected to be more careful when they open an ampoule. Its solidity and sharpness can scratch their hand, and the debris of the broken glass of its head may fall into the ampoule containing drugs, which can cause harm to the patient. We recommend that nurses use this “ampoule opener,” statistically proven to be more comfortable and safer for their works.

REFERENCES