

Evaluation of Usability of Packaging for Infusion Drugs

-Common Issues for Users-

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Abstract: The number and variety of infusions in the field of medicine are increasing, and most infusion drugs are handled by nurses. However, there has been few reports with regard to usability and safety issues with infusion packages. In this study, the usability of infusion drug packaging, with the cooperation of nurses. Overall questions were evaluated using 4 levels, from 1 (worst) to 4 (best). The average score for infusion packages covering all areas was 3.2; however, the conventional infusion pack scored 2.5 and intra venous transfusion 2.6. Furthermore, some practical needs were pointed out by nurses.

Keywords: infusion; packages; usability; nurses

1. Introduction

The number and variety of infusions and injections in the field of medicine are increasing, and there is also an increase in the variety of ways they are used. As for infusion and injection, since they are being used directly to vessel, it is particularly important to keep them clean from the stage of production in the factory to their usage in clinics. The users of infusion and injection drugs always take care to ensure a clean environment avoiding infection, contamination and accidents when they handle them. Drug Packages and medical tools should be designed for a high level of quality in usability and safety. However, up to this point there have been few reports of medical packages evaluated by real users, such as nurses, doctors and pharmacists [1-2]. So we studied usability and safety issues of infusion and injection drugs with the cooperation of nurses working in hospitals. In this paper, we attempt to analyze the packaging of infusion related drugs.

2. Method

In 2009, from May to June, questionnaires, which included usability and safety issues in the use of injection and infusion drugs, were given to hospital nurses. All questions were evaluated using 4 levels, from 1 (worst) to 4 (best). In addition, nurses were allowed to insert free comments about injection packages and their usability.

3. Results

There were 65 nurses who responded. The lengths of service in nursing are shown in Table 1. To analyze the infusion packages, we devised 6 areas, including overall evaluation of packages, demonstration and information, usability, availability of storage, quality, and price. Fig 1 shows the usability of infusion packages. The conventional type infusion bag and the intravenous hyperalimentation (IVH) infusion bag had lower scores than the others. Fig 2 shows the availability of keeping, with only the conventional infusion bag scoring below 3. As

for the level of instruction, the score for blood sampling was 2.7, the lowest. As for the general evaluation of several packages for infusion and blood transfusion, the scores were from 3.1 to 3.3 (Fig 3). Corrected free comments included opinions for every area of infusion and blood transfusion, particularly the usability and difficulty of mixing, with two packages (6), and the difficulty of snapping the upper-side of infusion packages (6) were the most common problems. Also there in some cases there was a need for packages which take into consideration risk management.

Length of service in nursing (years)	Number (n=65)
<1	2
1-2	10
2-3	5
3-4	6
4-5	9
5-10	15
>10	18

Table 1. The length of service in nursing

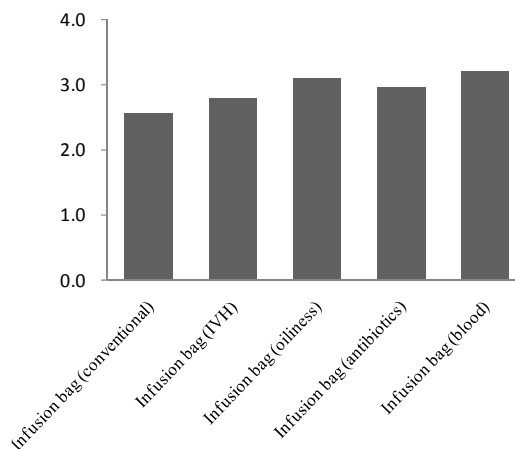


Figure 1. Evaluation of usability of infusion drugs

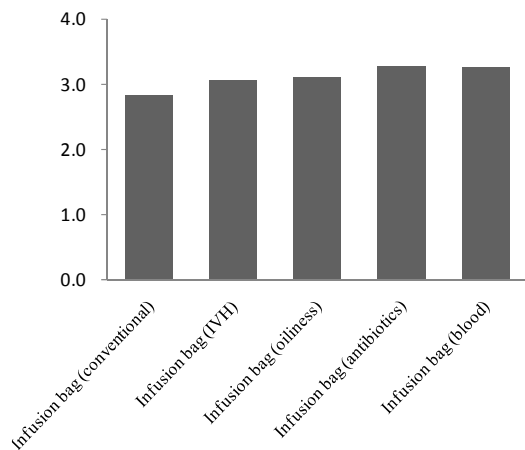


Figure 2. Evaluation of keeping of infusion drugs

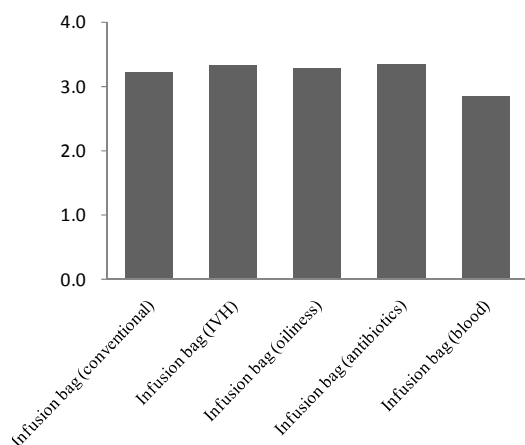


Figure 3. Evaluation of demonstration and information of infusion drugs

4. Discussion

In the overall evaluation of infusion packages, the average score was above 3. However, the usability of the conventional infusion pack was scored lowest and there were responses from those of the opinion that there was air contamination (7) and that the connecting tube was not long enough (4). Since conventional infusion drugs are most commonly used in hospitals and clinics, these problems could be reflected in the frequency of occurring accidental problems [3-5]. Concerning keeping infusion packages, it is obvious from free comments that nurses are always thinking about the most efficient way to use space for stock in their work rooms. They consider that the storage space in hospitals and clinics is limited, although it is crucial for

the timely supply of infusion drug, which means that every infusion drug should always be kept properly shelved in the hospital ward. If there is a type of infusion package that is easily piled up or can be laid like bricks, this would be useful for nurses working in the wards and clinics. As with the standing infusion pack, there is the need to innovate effective storing style. Looking at the instruction labels, the reason for the worst score by blood sampling spits was the high risk of mistakes when nurses are handling them. One idea suggested in the free comments, was to use colored labels depending on different usages. This would be very helpful for distinguishing samples. There is the possibility of developing color labels for several infusion packages. Other needs arising from the comments are that nurses want to know more information about suitable storage conditions for infusion packages, such as how cool a temperature is necessary and the most stable conditions for mixing antibacterial drugs. Instructions which include understandable package information could contribute to less risk at work. Some ideal infusion packages have been developed, such as the double-bag, standing bag and easily mixing bag. However, the usability evaluations by real users could be taken into consideration for next generation infusion packages. Furthermore, even in the medical area, we

The most common comment in 6 categories	Number (n=65)
Packages: The infusion drug generates a large amount of trash.	4
Demonstration and information: Additional information is needed.	6
Usability: The infusion drug packages are hard to open.	3
Availability of storage: Infusion drugs are too big to keep.	8
Quality: Sometimes the color of fluid in infusion drugs changes when stored for long periods.	2
Price: Infusion drug prices are high.	2

Table 2. The most common comment in the 6 categories

must think about ecological package design as well as safety.

5. Conclusion

There were problems, most common of which were hygiene and risk management. In particular, opinions and the need for handling and mixing of IVH are worth considering.

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