

Evaluation of Usability of Packaging for Injection Drugs

-Common Issues for Users-

Masaru Mizoguchi, Takahiro Yamanouchi, Noriyuki Kinoshita, Tsuyoshi Saeki, Kiyomi Sadamoto

Department of Clinical Science Faculty of Pharmaceutical Sciences, Toho University Chiba, Japan

Abstract: The number and variety of injections in the field of medicine are increasing. However, there have been few reports regarding usability in injection packages evaluated by real users. In this study, the usability of injection drugs, with the cooperation of nurses. For the overall evaluation of injection packages, the average score was above 3 (on a scale of 1 to 4, with 1 being the worst and 4 the best). However, there were common demands which included the dangers of free glass injection, and needs for injection packages that lessen the risk.

Keywords: injection; packages; usability; nurses

1. Introduction

Injections are used in a variety of areas from blood examination to therapy and play a highly critical role in medicine. As well as infusion, injections are used intravenously. The users of injection drugs always take care that there is a clean environment, avoiding infection, contamination and accidents. This means that the usability of injection packages is closely related to the safety management of medical care. In spite of drug quality, there has been little reported on injection packages evaluated by real users [1-3]. On the other hand, accidental error has been reported in injection usage [4]. It is necessary to discover the real issues of usability in injections related to packages. So we studied the usability of infusion and injection drugs with the cooperation of nurses, the performers of injections.

2. Method

In 2009, from May to June, questionnaires which included usability and safety matters in the use of injections and infusion drugs were given to hospital nurses. All questions were evaluated according to 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 injection packages, we devised 6 areas, such as the overall evaluation of packages, demonstration and information, usability, availability of storage, quality, and price. The average score for the overall evaluation of injection packages was 3.2; however, the score for injection made from glass syringes was 2.5, which was the lowest in any kind of injection. As for usability, only glass was had a score of below 3 (Fig 1). This tendency is similar to that of availability of storage (Fig 2). From the free comments, 8 nurses pointed out that their experience of cutting a finger and 7 nurses were anxious

about contamination of glass particles into fluid when they broke glass. In fact, one experienced contamination. Ten nurses pointed out that rolling and breakage of glass injections are common accidents when using and storing them. From the comments on label instruction, 5 nurses pointed out that there are confusing instructions between mg and ml or other scales of label instruction with injections. The average score for quality and price assessment was 3.1 ± 0.1 . There is no significant difference in the scores for every kind of injection. About the vial, there were 4 comments that included the difficulty of mixing powder, the difficulty of using too small a

Table 1. The length of service in nursing

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

bottle, the imbalance of the bottle size and the fluid and the inappropriateness of the glass for the fluid pack in everyday use. Two nurses pointed out that there was no way to care for the change in quality while storing injection drugs and that it was not clear how to store them properly with their packaging.

4. Discussion

For the overall evaluation of injection packages, the average score was above 3, and the average score for usability, instruction and quality was also above 3. This means that there were not many problems in the work place. There were a lot of common demands for individual injection packages and their labels. In particular, for glass containers, not only the safety conditions of

usage for nurses, but also the danger of contamination of glass in fluid is serious issues in clinical work [5-6]. Assuming some injection drugs are not suitable for plastic packaging, because of chemical change, promoting the plastic pack would be essential for injection drugs. It may necessary to innovate a pack of plastic or other material, which would be suitable for a lot of drugs. Since nurses use a variety of injections in accurate conditions, they hope to find easily understandable labeling and packages that are safe to use. Different from pharmacists, nurses will have studied little about drugs and their chemical behavior, so understandable explanation(s) for safe usage could be checked regularly (Table 2). In hospitals and clinics it is difficult to develop cost consciousness. However, there are a lot of expensive drugs. Some information which develops consciousness of price when handling drugs could contribute to ecology.

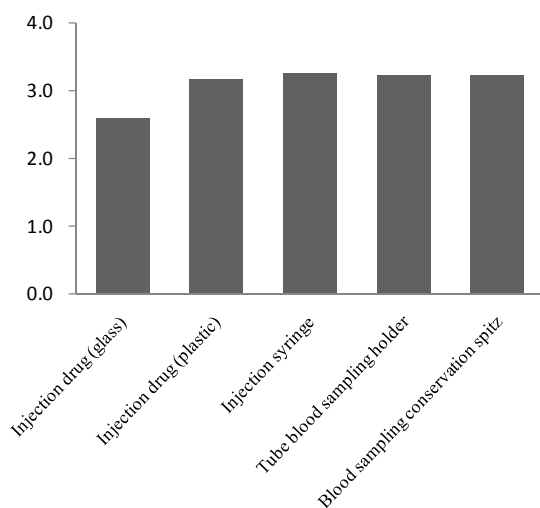


Figure 1. Overall evaluation of injection drugs

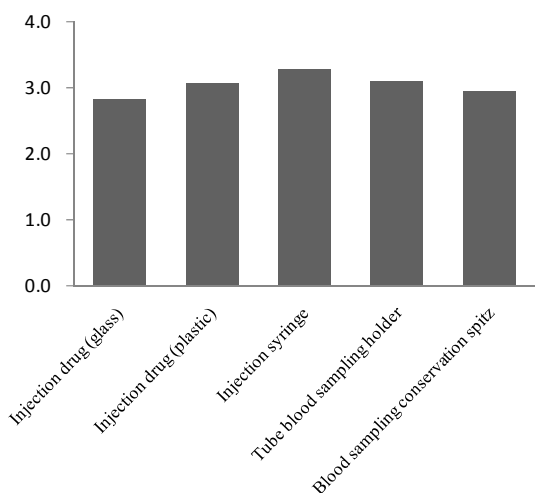


Figure 2. Evaluation of storage of injection drugs

Table 2. The most common comment in 6 categories

The most common comment in 6 categories	Number (n=65)
Packages: There is a possibility of contamination of glass particle into fluid when they cut glass.	7
Demonstration and information: Sometimes instruction of mg and ml or other scale is confusing.	5
Usability: There are experiences of cutting finger on glass injection.	8
Availability of storage: There are experiences rolling and broken of glass injection.	10
Quality: There is no way to care for the quality change while keeping injection drugs.	2
Price: Injection drug prices are high.	2

5. Conclusion

There are strong needs for injection packages that carry low risks. In addition, nurses want to promote not only their own safety but also that of everybody who is working and staying on the wards.

References

- [1] Sauberan JB, Dean LM, Fiedelak J, Abraham JA, Origins of and solutions for neonatal medication-dispensing errors, *Am J Health Syst Pharm*, 2010, 67, pp.49-57.
- [2] Benjamin DM, Reducing medication errors and increasing patient safety: case studies in clinical pharmacology, *J Clin Pharmacol*, 2003, 43, pp. 768-783.
- [3] Kawamura H, The approaches to factors which cause medication error-from the analyses of many near-miss cases related to intravenous medication which nurses experienced, *Gan To Kagaku Ryoho*, 2001, 28, 304-309.
- [4] Ernest SK., Injection safety: knowledge and practice among health workers, *West Afr J Med*, 2002, 21, pp.70-73.
- [5] Mahfouz AA, Abdelmoneim I, Khan MY, Injection safety at primary health care level in south-western Saudi Arabia, *East Mediterr Health J*, 2009, 15, pp. 443-450.
- [6] Preston ST, Hegadoren K, Glass contamination in parenterally administered medication, *J Adv Nurs*, 2004, 48, 266-270.