The use of Safety Engineered Device Needles as a standard needle for blood sampling

Is the use of SED needles as a standard needle a good investment for a hospital?
Comparing study between hospitals in Belgium and in Denmark

Siel De Smul - Sjaellands Universitetshospital Roskilde

Introduction

A Needle Stick Injury (NSI) is a wound caused by a sharp needle that is used for blood collection or injection. Therefore, a health care worker (HCW) has a risk for a bloodborne infection from a patient. For the safety of the HCW, there is a lot of research to decrease the amount of NSI, this includes training and safety engineered devices (SEDs) for needles.

The aim of this article is to investigate the benefits of SED needles as a standard needle to perform blood collection.

Materials and methods

This research was a literature study to investigate the use of Safety Engineered Devices and training with the occurrence of needle stick injuries. Also, the required investment in SED needles were balanced against the reduction of NSI in a cost-benefit analysis. As a source, the online database PubMed was used.

In addition to this literature study, the actual data of 3 hospitals, two in Belgium (GHB - Leuven and HHZ - Lier) and one in Denmark (Roskilde) were compared and further analyzed.

Results

The WHO stated that in 2016 there were over 2 million cases worldwide reported by 35 million HCWs exposed to NSI. [2]
For the safety of the HCWs, there is a lot of research to decrease the amount of NSIs. The one field of research is improving the technology for blood collection, including the introduction of SED needles. Another field of research is the impact of training of the blood collection staff.

In a study in UZ Antwerpen, an evolution was made of the amount of NSI with winged needles from 2005 until 2016. Figure 1 shows that the occurrence of NSI decreased, 2 times. [1]

A reduction was noticed in 2007 at a time when training was provided on the right usage of butterfly needles. In 2014 there was a sudden shortage of conventional needles. So there was a temporary introduction of SED needles. After that period, the hospital ordered conventional needles again. At that moment, the amount of NSI increased. Then, the hospital decided to choose for SED needles. [1]

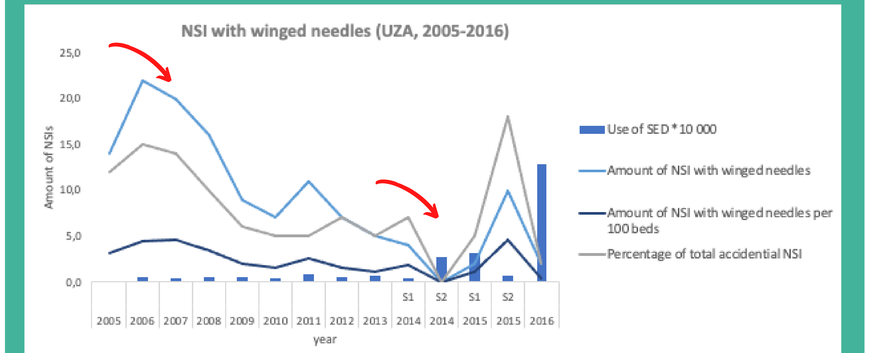

Figure 1: NSIs with winged needles (UZA, 2005-2016) adapted from (Van Laer, 2016)

In a theoretical study, the financial impacts were investigated. The cost of an SED needle is on average 60% higher than a conventional needle for blood collection. Otherwise, the amount of NSI is decreased with 70%. There are a lot of costs related to NSI, depending on the injury type op NSI, that can be saved by introducing SED needles. These costs include:

- testing after the NSI,
- PEP (virus spread mitigation drug)
- disease treatment
- counseling
- staff absence
- compensation and litigation [3]

In addition to this literature study, the actual data of hospitals in Belgium (GHB-Leuven and HHZ-Lier) and in Denmark (Sjealland universitetshospital-Roskilde) were compared and further analyzed, seen in table 1.

Table 1: The NSIs per 100 occupied beds and the percentage of SED and non-SED needles in different hospitals with two hospitals in Belgium and Denmark

	NSIs per 100 occupied beds	NSIs per 100 occupied beds including unreported NSIs	Percentage of use SED(%)	Percentage of use non-SED (%)
DK (Roskilde, Sjaeland universitatshospital, 2021)	1,3	/	100%	0%
BE(Leuven, UZG, 2014)	3,1	7,0	/	/
BE (Lier, HHZ, 2021)	2,5	/	0%	100%

In Lier there was a higher number of NSIs than in Roskilde. Also, Lier uses only non-SED needles compared to Roskilde who uses 100% SED needles. In Leuven there was an even higher amount of NSIs per 100 occupied beds, but it wasn't possible to get the exact percentage of SED and non-SED needles from the hospital. Moreover, the data of Leuven was from 2014 and the data of Lier and Roskilde was from 2021. Also, in Lier and Roskilde there were no numbers on the amount of unreported NSIs.

Discussion and conclusion

Several studies have shown that the number of NSI decreases after the introduction of SED needles, especially when additional training was provided. Overall, the introduction resulted in cost decrease, considering the additional cost of SED needles.

The data from the hospitals in Lier (Belgium) and Roskilde (Denmark) show that the use of SED needles in Roskilde reduce in the amount of NSIs compared to the hospital in Lier, where non-SED needles are used.

In this article, the occurrence of NSI, while using SED vs non-SED needles, was compared. Data on NSIs for blood collection is already challenging to compare between different hospitals, because the parameters in the report are different. But it's even more complex to compare the training levels, work pressure and skill set of the HCWs. This can also have an impact on the reduction of NSI.

Referenties:
[1] Van Laer, F., Coenen, E. (2016). De Impact van veiligheidsvleugelnaalden op de incidentie van prikongevallen in het UZA. http://www.nosoinfo.be/nosoinfos/de-impact-van-veiligheidsvleugelnaalden-op-de-incidentie-van-prikongevallen-in-het-uza/?lang=nl
[2] Ballout, R. A., Diab, B., Harb, A. C., Tarabay, R., Khamassi, S., & Akl, E. A. (2016). Use of safety-engineered devices by healthcare workers for intravenous and/or phlebotomy procedures in healthcare settings: a systematic review and meta-analysis. BMC Health Serv Res, 16, 458. https://doi.org/10.1186/s12913-016-1705-y
[3] Hanmore, E., Maclaine, G., Garin, F., Alonso, A., Leroy, N., & Ruff, L. (2013). Economic benefits of safety-engineered sharp devices in Belgium - a budget impact model. BMC Health Serv Res, 13, 489. https://doi.org/10.1186/1472-6963-13-489