An assessment of safe injection practices in health facilities in Swaziland

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Objectives. To determine the magnitude and causes of unsafe injection practices in Swaziland.

Design. A safe injection practices questionnaire was administered and injection practice was observed.

Setting. A selected variety of health facilities in Swaziland.

Subjects. Health workers in each facility.

Outcome measures. Unsafe injection and collection for disposal practices.

Results. All injections observed involved disposable syringes. Although all injections were given at the correct site, using the correct dosage and equipment, unsafe injection technique was observed. Needles were changed on the same syringe at 8 facilities (31%) and syringes and needles were reused at 2 facilities (8%). Recapping of needles after use occurred at 8 facilities (31%). More than one-quarter of nurses reported having pricked their finger in the previous 6 months; in almost half of these cases this was after administration of an injection. Seven nurses (25%) recalled seeing a case of an abscess or a mild adverse event following an injection in the previous 12 months. Interviewers observed used syringes and needles being placed in a safe container in three-quarters of facilities. Almost all respondents reported that syringes and needles were buried or burned.

Conclusions. Auto-disable syringes should be used for all routine and supplemental vaccination. The increased cost of auto-disable syringes represents only a small increase in the national Expanded Programme on Immunisation (EPI) budget.

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The safety of injection practices in vaccination programmes continues to constitute a worldwide concern. According to studies conducted between 1989 and 1994, unsafe injection practices are widespread in West and East Africa.[1] Although the 550 million injections administered annually in the Expanded Programme on Immunisation (EPI) in developing countries comprise only a small fraction of all injections given (Hansen BS, Phiri ML. Safe injection pactices, taking short cuts in injection safety costs lives — unpublished paper, 1996), they are also subject to unsafe practices. According to reports, sterility cannot be guaranteed in up to one-third of vaccination injections.[2]

The growing awareness of the dangers of poor sterilisation and injection technique has motivated several countries to examine their practices. In the Yamoussoukro Declaration of 1994 African ministers of health pledged to ensure safety, with a single sterile syringe and needle used for injection throughout the continent (WHO. Yamoussoukro Declaration on the Safety of Injections — unpublished document, 1994).

In Swaziland, each child receives 8 injections to complete the routine vaccination schedule during the first year of life. Furthermore, as in many other countries, clients seeking curative care favour injectables over other forms of treatment.

Health workers in Swaziland are taught sterile practices and injection safety in basic training and during in-service training, and the EPI guidelines on safe practices have been distributed to all health facilities. However, unsafe injections continue to occur, even in settings where health workers have been properly trained and the policy of one needle and one syringe for each injection is known. The possible transmission of blood-borne pathogens such as HIV and hepatitis B through unsafe injections therefore continues to be a concern. Despite precautions by the Swaziland Ministry of Health to ensure safe injection practices, there have been reports of nurses suffering needlestick injuries, children suffering injection abscesses, and syringes and needles running out of stock. A health facility survey was conducted to determine the extent of unsafe injection practices and to identify mechanisms by which the safety of injections could be assured.

Methods

A safe injection practice questionnaire was 'piggybacked' onto a health facility study of acute respiratory infection (ARI), and many of the facilities were selected according to ARI survey criteria. The sampling frame consisted of those health facilities that saw 3 or more ARI cases per day during July 1996, the same month of the previous year of the study. This yielded a total of 27 facilities, all of which were included in the sample. An

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additional 7 private and company facilities were randomly selected and added to the list of facilities to provide a nationally representative sample. Twenty-nine of these 34 facilities provided injections and were included in the study. Injections were observed in 26 of these on the day of the visit.

Eleven government and 5 mission clinics, 4 company and 3 private clinics, 2 government hospitals, 2 non-governmental organisation (NGO) clinics, 1 mission hospital and 1 (government) health centre were selected. Data were recorded on a questionnaire adapted from a model data collection tool (provided by the Co-ordinator of Nursing Affairs, Commonwealth Regional Health Community Secretariat for East, Central and Southern Africa, entitled 'Injection Safety Rapid Assessment Questionnaire for Health Centres, 2 July 1995'). Interviewers were recruited from their health regions (equivalent to districts in other countries) and attended a 3-day training session where the forms were explained, role plays were enacted and further practice was obtained at the nearest public health unit where the data collection tool was pre-tested. Data collection took place on 10 - 17 July 1997. During this period, a small group of interviewers questioned regional health management teams (RHMTs) and nursing school principals on managerial issues related to EPI implementation, using a structured interview guide. Quantitative data were entered, cleaned and analysed using EPIINFO version 6.03 software.

Data on disposal of used syringes and needles were collected both by observation and reported practice. To minimise potential interviewer and/or respondent bias, all parties were assured that information gathered would not be used as a basis for career promotion or for taking disciplinary measures. Free and informed consent was obtained before data collection. Codes were used for health facilities and respondents.

Results

Twenty-nine nurses-in-charge were interviewed and injection technique for EPI vaccinations was observed in the 26 facilities providing injections on the day of the visit.

When nurses were asked about the number of children they vaccinated each day, just over half estimated that they gave 2 - 3 intradermal BCG injections per day and 10 - 20 vaccinations per day for other antigens. The range of estimates for all antigens per nurse was 0 - 125 injections per day.

Injection technique

A total of 87 injections were directly observed. Not all injections administered in the health facility could be observed on the day of the visit because of limited time available. All nurses used disposable syringes and needles. All injections observed were administered using the correct dosage, at the correct site and with the correct equipment. However, as summarised in Fig. 1,

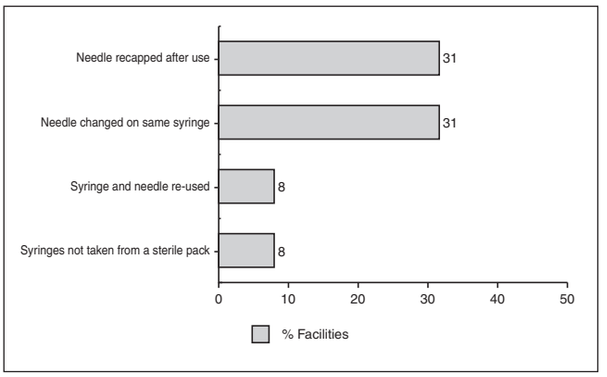

Fig. 1. Injection technique, Swaziland 1997.

needles were recapped in 8 facilities (31%), changing needles on the same syringe was observed in 8 facilities (31%), 2 facilities (8%) re-used disposable syringes and needles, and syringes were not taken from a sterile pack in 2 facilities (8%). These practices were observed in most categories of health facility, and in all regions.

Eight nurses (28%) reported having pricked their finger in the last 6 months. Four of these pricks occurred before the injection and 3 after the injection, while the timing of 1 was not recorded in relation to injecting the client. All nurses who pricked their finger before giving the injection reported discarding the needle. There were no reports of needlestick injury in those facilities that were observed to re-cap needles. Seven nurses (25%) recalled seeing a case of an abscess or adverse event following an injection in the previous year.

The reasons given for changing needles on the same syringe and re-use of syringes and needles were fear of stock running out, high cost of syringes and needles, and that it was an existing practice in the facility that the nurse did not feel able to change.

Supply of syringes and needles

Twenty-five facilities (93%) had sufficient stock of syringes and needles for at least 2 weeks. In all except 2 facilities, the number of needles in stock was inconsistent with the number of syringes. In some facilities the stock of needles exceeded that of syringes. In other facilities the reverse was true. In certain cases the stock discrepancy reached as much as a 10-fold difference. Seven respondents (24%) had run out of syringes and needles in the previous 6 months. Four stock-outs were due to insufficient delivery. Other reasons were not recorded.

In 3 cases, routine services were suspended, in 2 of these cases for a period of 7 - 14 days. When asked what action was taken, 2 nurses said that they referred clients and 1 nurse reported using insulin syringes instead. Further probing on the extent of use of insulin syringes was not done.

Disposal of contaminated syringes and needles

Fig. 2 illustrates the reported disposal of used syringes and needles. Just over half of the nurses reported putting used syringes and needles in a sealed box or a 2.5 litre medicine container. WHO/UNICEF-recommended safety boxes were used in only 3 facilities. In 1 facility the WHO/UNICEF box was reportedly emptied and re-used. Twenty-four per cent of nurses reported using an unacceptable method of disposal.

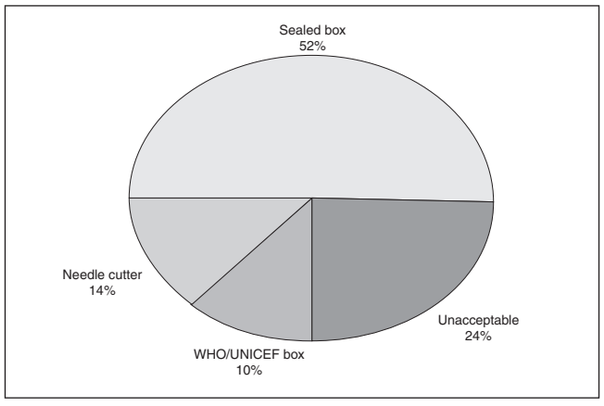

Fig. 2. Collection for disposal of syringes and needles, Swaziland 1997.

When observing practices, the criteria for safe disposal were defined as: (*i*) used injection equipment not put in a receiver (e.g. kidney basin); (*ii*) needle not recapped; and (*iii*) syringe and needle either placed in a puncture-proof sealed box or disposed of by means of a needle cutter immediately after use. Based on observation, 77% of facilities placed used syringes and needles in a safe container, corresponding exactly with reported practice. Health facilities where unsafe practices occurred were primarily government, mission and NGO clinics.

Once placed in a container, 70% of nurses reported burning or incinerating used syringes and needles. The remaining 30% buried them or put them in a pit latrine. Disposal sites were not visited to determine if there was any residual risk to the community from incomplete destruction.

Mechanisms to support safety of injection practices

All RHMTs reported disseminating national EPI policy guidelines on injection safety to all facilities and training health workers on that policy. All RHMTs reported providing a budget for injection equipment, with clinic supervisors providing these supplies to health facilities on a regular basis. However, because of lack of transport, supervisors in some regions reported being unable to visit facilities for several months at a time. Interviews with staff at central level revealed that there was limited input from technical staff or from RHMTs regarding decisions on vehicle allocation to regions.

Contrary to RHMT perceptions, only 38% of nurses interviewed reported having a copy of the national EPI policy guidelines in their facility. Seventy-nine per cent of nurses reported that their staff had received basic training in EPI and 82% had received in-service training. All had received basic training in sterile practices and vaccine handling, and 60% had also received this training in-service. A total of 42% of nurses had received in-service training within the last month.

Fifty per cent of nurses had received a supervisory visit within the last 3 months, but 30% last saw their supervisor 10 or more months ago. During the last supervisory visit, 42% of nurses reported receiving adequate supervision on injection technique and said that syringe stocks and collection for disposal practices were checked. The only instance where supervision was associated with better practice was on re-capping needles ($p < 0.05$). Otherwise there was no association between frequency of in-service training and the implementation of injection safety practices.

Discussion

Health facilities in Swaziland use disposable syringes and needles because they are cheap and acceptable to the public. Of all the types of injection equipment available, they carry the highest risk to patients, health care workers and the community combined if they are reused, recapped or incorrectly disposed of.[3] Adherence to safe injection practices is therefore critical.

The observed dosage, site of injection and injection equipment used were correct in all health facilities, which is highly commendable. However, the findings of the present study clearly indicate that the client is particularly exposed to unacceptable risks from re-use of syringes and needles. Although community risk was not investigated directly, upon feedback of the study results to health workers in Swaziland there was general consensus that the community is also exposed to unacceptable risk from unsafe disposal of injection equipment. These findings are very disturbing because of the high prevalence of HIV and hepatitis B in the country. If we assume that 26% of women who delivered were HIV-positive at the time of the study[4] and 30% infect their newborns, then 7.8% or 1 in 13 infants presenting to health facilities is HIV-positive. Most health workers are vaccinating 10 - 20 children per day, so on average each day they will inject at least 1 HIV-positive child. This is especially disturbing if unsafe injections are indeed responsible for a greater proportion of HIV infection than previously thought.[5]

Disposable syringes and needles also carry risk to the health provider through recapping and inadequate disposal. Surprisingly, those who reported experiencing a needle prick were not observed recapping needles, although recall over a 6-month period may not be reliable and is a limitation for this indicator. One study[6] has reported that for every 500 injections

given, 1 health worker suffers a needlestick injury. The present study did not measure a comparable indicator, but 28% of respondents reported having pricked their finger in the previous 6 months and half of the fingerpricks took place after an injection, suggesting that health workers need to be much more careful.

Adequate support to ensure safe injections, namely adequate training, supervision and supplies, is essential to minimise the risks involved.[7] Of great concern is the very limited frequency, quality and impact of supervision that this study revealed in Swaziland. That there was considerable difference between stock levels of syringes and needles supports the observation that changing needles on the same syringe was common. Studies elsewhere have also revealed that despite staff training and knowledge of EPI policy, disposable injection equipment is re-used.[8]

Conclusions

There is no longer any justification not to switch to using auto-disable syringes for all routine and supplemental vaccinations. While the cost of auto-disable syringes remains marginally higher than that of disposable syringes and needles, in 1998 disposable syringes and needles represented only 4.7% of the total cost of the routine vaccine budget in Swaziland. In the same year, the cost of auto-disable syringes was twice the cost of disposable syringes and needles. However, by 2002, it was only 30% more. Increasing the investment in injection equipment therefore represents a small increment when compared with the total cost of the national EPI programme. In addition to auto-disable syringes, governments and partner agencies should ensure that EPI budgets include the cost of sufficient disposal boxes for all used syringes and needles.

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