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Incidence of Percutaneous Injuries and Non-Reporting Rates Among First-Aid Responders in Taiwan

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We determined the incidence of percutaneous (needlestick and sharps) injuries among emergency medical technicians (EMTs) in one county in Taiwan, compared this with the official reporting rate, and sought reasons for non-reporting. An anonymous questionnaire was distributed to all EMTs in that county, eliciting percutaneous injuries occurrences, reasons why, and reporting data. Data were analyzed by logistic regression. A total of 329 out of 353 EMTs completed the questionnaire, giving a response rate of 93.2%. Thirty-nine EMTs (11.9%) experienced at least one percutaneous injury in the preceding 12 months. Older, less experienced EMTs were at greater risk of percutaneous injuries. None of the EMTs officially reported their percutaneous injuries primarily because they thought reporting was not mandatory and that the reporting process was too complicated. About one in eight EMTs had experienced at least one percutaneous injury in the preceding year. None of these injuries was officially reported to their organization. Ways to make reporting more user friendly are required, along with resources to minimize percutaneous injuries among EMTs in Taiwan.

Keywords emergency medical technicians, percutaneous injuries, questionnaire, reporting, Taiwan

INTRODUCTION

Percutaneous (needlestick and sharps) injuries are a serious occupational risk factor for health care workers, putting them at risk of contracting HIV or hepatitis B and C. (1) The majority of studies of percutaneous injuries among health care workers has focused on nurses, as they are the largest paramedical group in the health care sector. (2) However, other paramedical groups are also at risk, such as laboratory personnel (3) and ambulance staff. (4,5) Ambulance staff, also known as first responders or paramedics, are at high risk for percutaneous injuries because they perform advanced life support procedures, such as cannulation, often in moving vehicles and with patients showing unpredictable movements.

In Taiwan, ambulance services are provided by fire departments. In 1995, Taiwan’s National Fire Administration (NFA) was established. Within the NFA, a separate section oversees the emergency medical services (EMS) operations of the country’s 23 local fire departments. Prior to 1998, the focus of EMS was transport of patients to hospitals. In 1998, a law mandated that first-aid equipment be carried in ambulances. Subsequently, all local fire departments trained firefighters as emergency medical technicians (EMTs).

Various studies have documented issues of percutaneous injuries in nurses in Taiwan, (6–9) showing a high incidence in this occupational health care group and a very high non-reporting rate of percutaneous injuries. To our knowledge, no published reports have documented percutaneous injuries among first-aid responders in Taiwan. We therefore determined a 1-year incidence of percutaneous injuries in one local Taiwan fire department, compared this with the official reporting rate, and sought reasons for non-reporting.

SUBJECTS AND METHODS

A questionnaire gathered data on whether the first-aid responder had experienced a percutaneous injury in the preceding 12 months and, if so, whether it was contaminated with blood, how the injury was incurred, whether the injury was officially reported, the reason why it was not reported, and whether the first-aid responder sought medical treatment. In addition, demographic data were solicited on gender, age, education, first-aid status, and whether specific lectures on
percutaneous injuries had been attended. The questionnaire was developed in English, translated into Mandarin Chinese, and then back translated to ensure that the meanings of the questions were not altered through the initial translation.

The questionnaire was distributed to the four Fire Control Groups in Changhua City and Changhui District in Taiwan. These four groups comprise 32 branches with a total EMT staff of 353. The EMTs were asked to fill out the questionnaire on a voluntary and anonymous basis. After 1 month, the completed questionnaires were collected and data entered into an Excel database.

Data were statistically analyzed using the software program “R” version 2.10.1 (Development Core Team 2010, Vienna, Austria). The likelihood of having a needlestick or sharps injury was modeled using logistic regression, with a p-value of less than 0.05 deemed statistically significant. Age and years of work experience were used as continuous variables in the logistics model. Statistical results are reported as odds ratios (OR) with 95% confidence intervals (95% CI).

The study protocol was approved by the Show Chwan Memorial Hospital Ethics Committee. The study protocol was explained to potential participants in written form, and written informed consent was obtained from participating EMTs.

RESULTS

A total of 329 out of 353 EMTs returned a completed questionnaire giving a response rate of 93.2%, ranging from 77.8 to 100% among the 35 branches of the four Fire Control Groups. Ten EMTs were female, the rest were male (n = 319). Average EMT work experience was 13.1 years with a range of 1 to 31 years. Two-hundred and eighty-two EMTs had advanced training at EMT-II level (280 hr additional training). Workshops/lectures specifically devoted to percutaneous injury had been attended by 63 (9.1%) of the respondents.

Thirty-nine EMTs (11.9%) experienced at least one percutaneous injury in the preceding 12 months: 6 needlestick, 28 sharps, and 5 both. In three of the injuries, the device was contaminated with blood, and in 20 incidents it was not; however, 16 EMTs were unsure if the device was contaminated. Fifteen EMTs experienced one percutaneous injury during the preceding 12 months, 7 were injured twice, 1 was injured three times, and 16 experienced an injury at least once but could not remember whether they had experienced more injuries in that time period. Thus, there were at least 48 percutaneous injuries experienced by the 39 EMTs. Six EMTs acquired their percutaneous injury through needle recapping, and six EMTs through patient irritability/uncontrolled movements. Thirty-eight EMTs washed or alcohol swabbed the affected area immediately, while eight EMTs did not. Two EMTs did not respond to this question. Only two EMTs sought medical treatment or advice following the injury.

None of the 39 EMTs who had experienced a percutaneous injury in the preceding 12 months officially reported the incident. Twenty-six EMTs thought reporting was not mandatory, two were too embarrassed to report it, and seven thought the reporting process was too complicated. Four EMTs did not reply to this question.

First-aid responders with EMT-I status were more likely to experience a percutaneous injury than those with EMT-II status; however, this was not statistically significant (OR: 1.80; 95% CI: 0.84–3.82; p = 0.13). Only three EMTs were stuck by blood-contaminated devices, while 16 were not sure. These 16 were categorized as probable contaminations. Analysis of the 19 EMTs who had or may have had a percutaneous injury with a blood-contaminated device showed that when age and years of work were included in the model, older EMTs (given the same number of years worked) were significantly more likely to experience an injury (OR: 3.14; 95% CI: 1.17–8.49; p = 0.02), and EMTs with more work experience (given the same age) were slightly less likely to experience an injury (OR: 0.60; 95% CI: 0.22–1.61; p = 0.31).

DISCUSSION

The main findings of our study were that about one in eight EMTs in one county in Taiwan had experienced a percutaneous injury in the preceding year, and that none of these percutaneous injuries was officially reported by the EMTs. The incidence rate of percutaneous injuries of 11.9% among Taiwanese EMTs in our study is similar to a recent large study of paramedics in the United States showing an overall 12-month risk for needlestick injury of 6.7%.[10] However, caution is required in this comparison as only three EMTs in our study reported that the device was contaminated with blood, while the U.S. study focused on contaminated needlesticks. Furthermore, the U.S. study was on needlestick injuries alone, and most of the percutaneous injuries were of that nature.

Incidence rates of percutaneous injuries have also been reported for health care workers other than EMTs in Taiwan. Thus, Shiao et al.,[8] using the Chinese version of EPINet (Exposure Prevention Information Network) estimated that the annual number of percutaneous injuries among full-time equivalent health care workers was 45.0 per 1000, with nurses showing the highest rate, followed in ascending order by medical doctors, laboratory workers, and support personnel. In Taiwan, nursing students appear to be at highest risk of percutaneous injuries, with a study showing an incidence rate of 61.9% during student nurse internship.[7] However, a recent study in New Zealand showed that medical doctors there had a higher 12-month incidence rate of percutaneous injuries than nurses (17.8 vs. 7.6%, respectively).[2] Again, caution is required in these comparisons because of different degrees of blood-contaminated devices in these studies.

Of the 39 Taiwanese EMTs experiencing a percutaneous injury in the previous year, none had officially reported the injury to their supervisors, which is a requirement. Under-reporting of percutaneous injuries by health care workers, including EMTs, has been reported by others. Under-reporting or non-reporting of percutaneous injuries by ambulance personnel in the United States has recently been estimated at...
49%, and in their literature review, the authors documented under-reporting of percutaneous injuries by EMTs to range from 20% to 52%. (4)

In a New Zealand hospital setting,(2) 27% of nurses, 40% of medical doctors, and 50% of midwives did not report needle-stick injuries. In one U.K. hospital, only 51% of medical doctors and nurses had reported needlestick injury, with medical doctors less likely to report than nurses.(11) In Taiwan, Shiao et al.,(9) using the Chinese version of EPINet software, showed that recall rate of percutaneous injuries by health care workers (medical doctors, nurses, laboratory workers, support personnel) was about five times higher than the official EPINet rate. The authors termed this an epidemic proportion of under-reporting and stated that percutaneous injuries remain a significant health care occupational injury.

We also found that older EMTs were more likely to experience a percutaneous injury, while EMTs with more work experience were less likely to experience a percutaneous injury. This implies that older, less experienced EMTs are at greater risk of percutaneous injuries.

The main reason for not reporting percutaneous injuries in our study was that the EMTs thought official reporting was not mandatory; another reason was that the reporting process was thought to be too complicated. EMTs in the Fire Control Groups in Changhua have been taught to report percutaneous injuries to the Disaster Relief and Rescue Command Centre, with the official report then to be sent to the First-Aid sub-section at Fire Control Headquarters.

Other studies of percutaneous injuries in health care workers have shown a wide variety of reasons of non-reporting. In the Taiwanese study of health care workers, the main reason for non-reporting was that the sharps or needle device was not being used on the patient.(6) Two other main reasons were that the worker was too busy at work to report or was not aware of a reporting requirement or how to fulfill it. These two reasons for non-reporting have also been found in other studies.(2,6,9,11) Other reported reasons for not reporting percutaneous injuries are having previously reported injuries, co-workers advising against reporting, a belief that nothing more can be done, and confidentiality concerns.

A limitation of our study is that it examined only one of the 23 fire departments in Taiwan, and the results may thus not necessarily reflect what happens in the other 22 fire departments. However, our main finding of a serious non-reporting or under-reporting of percutaneous injuries has been a universal finding from other studies, including among other Taiwan health care workers.(6) In addition, respondents may not have indicated that they had experienced a percutaneous injury because of the stigma attached to such injuries, and this may have been the case in our study. Another limitation is that questionnaires can elicit biased responses. However, the questionnaire was anonymous, and we believe that our main finding of the non-reporting rate was not affected by this. The strength of our study was the almost total response rate of the EMTs, thus virtually eliminating a response bias.

Percutaneous injuries from devices that are not contaminated with blood do not carry the risk of infection with HIV, HBV, or HCV. Only three of the injuries from our study were due to blood-contaminated devices. However, in 16 incidences, the EMT was not certain the device was blood-contaminated and this may have been so.

CONCLUSION

About one in eight EMTs in this study had experienced at least one percutaneous injury in the preceding year. Older but less experienced EMTs were at greater risk of experiencing such injuries. However, none of these injuries was officially reported. Reasons for non-reporting were: (1) the perception that this was not mandatory, and (2) the reporting process was thought to be too complicated. Overall, our findings suggest that management makes an effort to make reporting more user-friendly and to ascertain what the barriers are to non-reporting, as well as to ensure that resources are available to minimize percutaneous injuries among EMTs in Taiwan.

REFERENCES