[Short Communication]

Needlestick and Sharps Injuries among Australian Medical Students

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Abstract: We investigated the prevalence and distribution of Needlestick and Sharps Injuries (NSI) among a group of Australian medical undergraduates from 4 consecutive grades. Data was obtained by means of an anonymous, self-reporting survey. A total of 254 questionnaires were obtained (response rate 97.3%). Among them, 35 students (13.8%) had suffered a total of 41 NSI incidents. By gender, 71.4% of the NSI reporters were female and 28.6% were male. NSI prevalence varied significantly with respect to students' year of study (P for Trend=0.0106), ranging from 7.3% in the 1st year to 26.8% in the 3rd year. Of the 41 NSI incidents, 29.2% were caused by a glass item, 24.4% by a hollow bore needle, 24.4% by another device and 22.0% by a surgical device. The distribution by causative device also varied from year to year. Overall, this study has shown that NSI represent an important hazard for Australian medical students. As such, the importance of intervention strategies to reduce NSI exposures must remain an essential facet of medical education, worldwide. Future preventive measures will also need to consider the unique situation of medical students in Australia, as elsewhere.

Key words: needlestick, sharps, injury, medical student, Australia.

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Introduction

Needlestick and Sharps Injuries (NSI) are known to represent a significant hazard for medical students during their clinical training [1, 2]. In Israel for example, Shalom *et al* [3] found that half of their students (50%) suffered an NSI during two, 4-month periods of clinical training. Other international studies have documented NSI prevalence rates as follows: Singapore (35%) [4], the United States (Virginia) (33%) [5], England (33%) [6], the United States (Missouri) (30%) [7], France (24%) [8] and Australia (22%) [9]. Research has also shown that students experiencing an NSI on their first clinical rotation were nine times more likely suffer an NSI on their second rotation [3]. Despite this fact, few studies have investigated NSI among multiple grades of students within medical schools. Most pre-

vious research investigated a single grade [3, 5, 9] or sourced their data from reported NSI incidents [2]. Such methodologies may underestimate the true prevalence, as it has been previously shown that NSI under-reporting is common among medical students [5–9]. For example, Waterman *et al* [6] demonstrated that 75% of British medical students did not report their injury. Similarly, de Vries and Cossart [9] documented a low reporting-rate of 22% and 45% among Australia medical and dental students, respectively. Other research has also revealed suboptimal NSI reporting among medical students in the United States (43%) [5] and France (39%) [8]. Given these limitations, we considered it necessary to investigate the prevalence of NSI among a multi-grade cohort of medical students at an Australian university. In order to establish the overall group rate and to elucidate potential risk factors, we specifically asked all students to complete the survey, regardless of whether they had ever experienced an NSI or not.

Materials and Methods

For this study we recruited a complete cohort of on-campus undergraduate students from a new medical school in tropical northern Australia in 2004. Data was obtained by means of an anonymous, self-reporting survey adapted from previous international studies [1–9]. Our instrument was divided into two parts, with the first containing questions on demographic items, such as age, sex and year of study. The second section asked if they had ever experienced an NSI while studying as a medical student, and if so, had the item been previously used on a patient and exactly what device caused their injury. Questionnaires were distributed to students in each of the first 4 grades at the end of a pre-arranged lecture period. All students were asked to complete the survey, regardless of whether they had ever experienced an NSI or not. Informed consent was implied when they completed and returned their questionnaires. The 5th year students had already started clinical rotations away from the university when our investigation began, and therefore it was considered unethical to contact them individually, due to privacy restrictions. As our medical school was also new, there were no 6th year students available for the study. Data was entered into a common spreadsheet program and analysed by statistical software. NSI prevalence rates were calculated as a percentage of all students who suffered an NSI and also as a percentage of NSI cases per subcategory. Computed 95% Confidence Intervals (95% CI) were included for subcategory prevalence rates. Statistically significant differences between the subcategories were evaluated using the chi-square test and P for Trend. Probability values below 0.05 were regarded as statistically significant throughout.

Results

A total of 261 questionnaires were distributed, from which 258 were received. Four in-

Table 1. NSI prevalence and distribution among Australian medical students

	NSI	Students	% ^a	(95% CI) ^b	P value ^c
Gender					
Male	10	98	10.2	(5.6–17.8)	—
Female	25	156	16.0	(11.1–22.6)	0.1901
Year of study					
1st Year	6	82	7.3	(3.4–15.1)	—
2nd Year	7	62	11.3	(5.6–21.5)	—
3rd Year	15	56	26.8	(17.0–39.6)	—
4th Year	7	54	13.0	(6.4–24.4)	0.0106
All Years	35	254	13.8	(10.1–18.6)	—

^a: Percentage of students in each subcategory who suffered an NSI, ^b: Computed 95% Confidence Interval (95% CI) for prevalence rates, ^c: Statistically-significant differences in NSI prevalence evaluated using the chi-square test and P for Trend (NSI—Needlestick and Sharps Injuries)

complete questionnaires were then excluded, giving an overall response rate of 97.3%. Among the respondents, 35 students (13.8%) had suffered a total of 41 NSI incidents (32 who experienced a single NSI and 3 who experienced multiple NSI). By gender, 71.4% of the NSI reporters were female and 28.6% were male. Sixteen percent of all female and 10.2% of all male students reported an NSI during this study. The difference in NSI prevalence by gender was not statistically significant, however ($P=0.1901$). NSI prevalence varied significantly with respect to the students' year of study ($P=0.0106$), ranging from 7.3% in the 1st year to 26.8% in the 3rd year. Computed confidence intervals revealed that between 17.0% and 39.6% of all 3rd year students reported an NSI of some description. First year students reported the lowest NSI prevalence of all (7.3%, 95% CI 3.4–15.1). Refer to Table 1. Of the 41 NSI incidents, 29.2% were caused by a glass item, 24.4% by a hollow bore needle, 24.4% by another device and 22.0% by a surgical device. The distribution by causative devices varied from year to year. For example, the majority of NSI cases caused by hollow bore needles or surgical devices were experienced in the 3rd year. Alternatively, 4th year students comprised the majority of those who reported a glass item injury. First year students mainly received their NSI from glass items and other devices. No 1st year students reported an NSI from hollow bore needles during this investigation. Refer to Fig. 1.

Discussion

The overall prevalence of NSI during this study was 13.8%. As such, our results were considerably lower than other international research conducted among medical students in Israel (50%) [3], Singapore (35%) [4], the United States (Virginia) (33%) [5], England (33%) [6], the United States (Missouri) (30%) [7] and France (24%) [8]. Interestingly, a

Fig. 1. NSI prevalence rate by NSI device and year of study.

□ : Hollow bore needle, ▨ : Surgical device,
 ▤ : Glass item, ■ : Another device.

previous study of Australian medical students conducted in 1994 also revealed a higher overall NSI prevalence than ours (22%) [9]. One probable reason for these discrepancies may relate to sampling methodology. Medical students represent a difficult group to capture, particularly when they begin clinical rotations. Given these limitations, most previous NSI research among medical students has targeted a single grade [3, 5, 9]. Of the NSI investigations conducted among multiple grades, the prevalence rate seems to fall as the sampling method becomes more comprehensive. For example, an NSI prevalence rate of 30% was documented among 3rd and 4th year medical students in the United States [7]. Alternatively, the prevalence was 24% among French medical students in the 4th, 5th and 6th grades [8]. This disparity seems to suggest that higher grades may suffer the majority of NSI among medical students. Alternatively, there could be some other unknown or unmeasured factor influencing the results and inflating NSI prevalence in the higher grades. For example, an increased awareness of the importance of NSI reporting may occur in the higher grades, as students work their way through medical school.

Either way, we were surprised to find that 3rd year students reported the highest NSI prevalence during our study (26.8%). Interestingly, a previous investigation conducted in Great Britain showed that 3rd year students suffered NSI at a rate lower than the 4th years (12.1% vs. 33.3%) [6]. Given these considerations, it is difficult to understand exactly why our elevated risk occurred. The most likely scenario is that the 3rd year represents a medical student's first exposure to complicated clinical procedures involving needles and other

sharp instruments. As such, the importance of intervention strategies to reduce NSI exposures must remain an essential facet of medical education, worldwide. Previous trials have already shown that educational and skills-training programs can be useful in this regard [10]. Future preventive measures will also need to consider the unique situation of medical students in Australia, as elsewhere.

Conclusion

Overall, our study has shown that NSI represent an important hazard for Australian medical students. The causative device, distribution and overall prevalence of these injuries was, however, not homogenous across multiple years of study or genders. Females and 3rd year students appear to suffer the majority of NSI within our medical school. Further research will therefore be needed to clarify exactly why this phenomenon occurs.

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オーストラリアの医学生の針刺事故

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要 旨： 我々はオーストラリアにおける医学生の針刺事故(NSI)の現状についてある医学校の4学年を対象に調査を行った。調査は匿名の自己報告によって行い、254名の解答(回収率97.3%)が得られた。その内35名の学生(13.8%)が事故を報告し、総計41回のNSI事故があった。性別では、NSIを報告した71.4%が女子学生で、28.6%が男子学生であった。NAIの頻度は学年間で優位($P=0.0106$)な変化が認められ、1年生では7.3%に対し、3年生では26.8%であった。41回のNSIの内、29.2%はガラス器具、24.4%は注射針、22.0%が手術器具、24.4%がそれ以外の用具によるものであった。原因器具の割合も学年により変化が見られた。全体として、この研究はNSIがオーストラリアにおける医学教育上、重要な問題である事を示している。そして、NSIを少なくする為の方策が、世界中の医学教育に重要な問題として残されている。将来NSIを予防する為に、オーストラリアおよび他の国々の医学生のおかれている立場も考慮しなければならない。

キーワード： 針刺事故, 医学生, オーストラリア.

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