

Incidence and reporting of sharps injuries amongst ENT surgeons

A VIJENDREN¹, J SANCHEZ², M YUNG¹

Departments of ¹ENT and ²Occupational Health, Ipswich Hospital, UK

Abstract

Background: Sharps injuries are a common occupational hazard amongst surgeons. Limited work has been conducted on their effects within the ENT community.

Methods: A literature review was performed and a survey on sharps injuries was distributed to the entire membership of ENT-UK electronically.

Results: The literature review revealed 3 studies, with 2 of them performed more than 20 years ago. A total of 323 completed questionnaires were returned (24 per cent response rate). Of the respondents, 26.6 per cent reported having experienced sharps injuries. There was no statistical difference between the occurrence of sharps injuries and the grade, length of time spent in the specialty or subspecialty of respondents. Only 33.7 per cent of afflicted clinicians reported all their injuries as per local institutional policies. No seroconversions were reported.

Conclusion: The study found poor evidence on sharps injuries amongst ENT surgeons, and low reporting rates that were comparable to other studies conducted in the UK. This highlights the need for further research and increasing awareness on sharps injuries regulations within the specialty.

Key words: Sharps Injuries; Needle-Stick Injuries; Otorhinolaryngology; Blood-Borne Pathogens

Introduction

Sharps injuries or percutaneous injuries are defined as an incident that causes a needle, blade (such as a scalpel) or other medical instrument to penetrate the skin.¹ It has been noted as the second commonest occupational injury within the National Health Service (NHS).² Surgeons have been shown to be particularly at risk,³ with the operating theatre environment being a common setting for such injuries to occur.⁴

The main risk from sharps injuries is potential exposure to blood-borne infections.¹ In 2006, two cases of hepatitis C virus (HCV) seroconversion were reported, with one of the cases occurring in an operating theatre.⁴ In addition, the 2012 'Eye of the Needle' report, published by the Health Protection Agency, noted five HCV transmissions from patients to healthcare workers between 2008 and 2011 following percutaneous exposure injuries.⁵ The risk of transmission through such injuries has been estimated at 1 in 3 for the hepatitis B virus, 1 in 30 for HCV and 1 in 300 for human immunodeficiency virus (HIV), whilst risk of transmission via mucocutaneous injuries is significantly lower.⁵ Other concerns include the psychological effects of sharps injuries, particularly the risk of developing post-traumatic stress disorder.⁶

The Health and Safety (Sharps Instruments in Healthcare) Regulations were enacted in 2013 to address such hazards.⁷ Based on the European Council Directive on the prevention of sharps injuries, these regulations outline the responsibilities and training needs of both employers and employees within healthcare institutions dealing with sharp instruments. The information sheet also describes a standardised action plan for healthcare workers afflicted with sharps injuries, including out-of-hours occurrences.⁷

Worryingly, the incidence of sharps injuries amongst surgeons is noted to be on the rise, whilst reporting rates are dwindling.^{5,8} Coupled with an increasing prevalence of blood-borne viruses in the general community,⁴ surgeons may be placing themselves at great risk on a daily basis. Limited work has been conducted on this common occupational hazard within the ENT community. Hence, we aimed to investigate how commonly sharps injuries are reported by ENT surgeons. In addition, we conducted a national survey to identify the incidence, reporting rates and effects of sharps injuries on UK otolaryngologists.

Materials and methods

A literature search was conducted of peer-reviewed articles published in the English language between

1990 and 2014. PubMed, Embase, Google Scholar, Medline and PsycInfo databases were searched using the following keywords in varying combinations: 'ENT', 'ear, nose and throat', 'otorhinolaryngologist', 'otorhinolaryngology', 'otolaryngologist', 'occupational health', 'occupational disease', 'occupational illness', 'work-related illness', 'work-related disease', 'needle stick', 'sharps injuries', 'percutaneous injuries' and 'otorhinolaryngologic surgical procedures'.

A survey containing questions on sharps injuries was distributed electronically to the entire membership of ENT-UK (the official society of otolaryngologists within the UK). A literature search did not reveal any existing validated questionnaires on this topic; hence, the authors designed the survey with guidance from the ENT-UK Survey Guardian. The survey incorporated questions on: the occurrence of sharps injuries within the last 12 months, the number of injuries (tick box options of 0–5, 6–10, 11–20 and more than 20 incidences), the frequency of reporting and adherence to trust policy, and any resultant illness from the sharps injuries (Figure 1). Demographic data on grade of respondent, subspecialty interest and years spent in ENT were also collected.

The questionnaire was distributed to 1344 ENT-UK members. This included: 796 consultants, 253 specialist trainees or specialist registrars, 105 junior doctors or senior house officers, 35 fellows and staff grade doctors, 70 associate specialists, 20 affiliated members (general practitioners, speech therapists, audio vestibular physician and so on) and 61 retirees.

All results were recorded on a Microsoft Excel™ spreadsheet and tabulated. A combination of chi-square and Fisher's exact tests were employed for all categorical data analyses. Ethical approval was not required as members of the aforementioned charitable organisation completed the survey on a voluntary basis.

Results

Literature search

Our literature search identified four studies. One of these was excluded as it pertained to mucocutaneous transmission rather than sharps injuries.⁹ Two studies were carried out in the early 1990s. A study by Benninger *et al.*, conducted in Detroit, USA, found that exposure to blood-borne infections was likelier in operations lasting longer than 3 hours, in head and neck operations, and during emergency surgery.¹⁰ A UK study by Endres *et al.* found that double gloving (wearing two sets of gloves) helped maintain an intact barrier between medical staff and patients: sharps injury perforation rates for the outer and inner layers were 35.3 per cent and 8.8 per cent respectively.¹¹ More recently, a poster presented at a 2010 Triological Society meeting showed that 72 per cent of 231 US otolaryngology residents experienced at least 1 sharps injury during their post-graduate training, with most injuries occurring in the operating theatre

and during head and neck operations. Fortunately, no seroconversions were noted, although 75 of the residents did not report their injuries appropriately.¹² Table I shows a summary of the papers reviewed.

National survey

We received a total of 323 completed questionnaires (24 per cent response rate); 224 responses were from consultants (28.1 per cent out of a total of 796 consultants). Eighty-six respondents reported having experienced sharps injuries within the last year, giving an incidence rate for respondents of 26.6 per cent.

Demographics

Grade of respondents. Sixty-two of the affected ENT surgeons were consultants, 10 were specialist registrars or specialty trainees, and 8 were a combination of associate specialists and staff grades. There were no details from six respondents. No statistical differences were seen in terms of the occurrence of sharps injuries between consultants and non-consultants ($p = 1$; Table II).

Years in ENT. Most ENT surgeons with sharps injuries had spent between 11 and 15 years in the specialty (Figure 2). The afflicted cohort had spent a mean time of 18.73 years and a median of 19 years working in ENT. No statistical differences were seen in the occurrence of sharps injuries between respondents who had spent 20 or fewer years in ENT and those with more than 20 years of experience ($p = 0.399$; Table II).

Subspecialties. Of those respondents with sharps injuries, 24 specialised in otology, whilst 18 were general ENT surgeons, 15 were head and neck surgeons, 9 were rhinologists, and 3 were paediatric ENT surgeons. Seven respondents with sharps injuries had varying subspecialist interests (dual specialties, sleep medicine, community ENT, and working in general practice with a special interest in ENT). There were no details from 10 respondents. No statistical differences were seen between the individual subspecialties ($p = 0.159$; Table II).

Number of injuries

Sixty respondents with sharps injuries (69.7 per cent) had experienced between zero and five injuries in the last year. There were no responses from 26 clinicians.

Reporting of injuries

Twenty-nine respondents (33.7 per cent) reported their sharps injury as per local policy at every single occurrence, 14 (16.3 per cent) reported them on occasion, whilst 16 (19 per cent) never reported their injuries. No details on this matter were available for 27 respondents (31.4 per cent). There were no differences in the reporting of sharps injuries between consultants and non-consultants ($p = 0.279$; Table III).

Sharps injuries

1 Do you feel you may have suffered from any sharps/percutaneous injuries within the last 12 months that have been a direct consequence of your job or workplace environment?

Yes (Please fill in questions 2, 3 & 4) No (Please go to Demographics section)

2 How many sharps injuries have you suffered in the last 12 months?

0–5 6–10 11–20 >20

3 Have you reported these injuries and followed local trust policy?

Yes Occasionally No

4 Have these injuries resulted in you being unwell?

Yes Please explain.....

No

Demographics

1 What level are you at?

SHO/core trainee SpR/StR Staff grade/associate specialist Consultant

2 How long have you worked in ENT?

.....years

3 What is your subspecialty?

General ENT Otology Rhinology Head & Neck Laryngology

Base of Skull Paediatrics Facial Plastics Other Please specify.....

Thank you very much for completing the questionnaire. Please return it to the ENT-UK Survey Guardian.

FIG. 1

Questionnaire on sharps injuries distributed to ENT-UK members. SHO = senior house officer; SpR = specialist surgical registrar; StR = specialty surgical registrar

TABLE I
SUMMARY OF STUDIES ON SHARPS INJURIES

Study	Year	Country	Sample size (n)	Specialty	Summary of results
Current study	2016	UK	323	ENT	Sharps injuries rate = 26.6%; reporting rate = 33.7% 38 contaminations occurred in 228 operations. Risk factors were: operation duration >3 hours, & head & neck operations
Benninger <i>et al.</i> ¹⁰	1991	USA	N/A	ENT	
Endres <i>et al.</i> ¹¹	1990	UK	34	ENT	Perforation rates for outer & inner glove layers were 35.3 & 8.8%
Maiberger <i>et al.</i> ¹²	2010	USA	231	ENT	Sharps injuries rate = 73%; reporting rate = 65.8%. Most exposures occurred in operating theatre. 32 (19%) of overall incidences involved blood-communicable disease. No resident reported seroconversion from exposure
Adams <i>et al.</i> ²	2010	UK	136	Various NHS staff	Sharps injuries rate = 25.7%; reporting rate = 58.8%. Awareness of local protocols was worse in junior doctors
Thomas & Murray ⁴	2009	UK	75	Various surgeons	Sharps injuries rate = 44%; reporting rate = 9% 840 sharps injuries in 2 years; reporting rate = 2.26%. Junior surgeons were more likely than senior surgeons to comply with protocols
Au <i>et al.</i> ⁸	2008	UK	42	Various surgeons	
Kerr <i>et al.</i> ¹⁴	2009	UK	164	Various surgeons	Reporting rate = 25.8%

N/A = not available; NHS = National Health Service

TABLE II
CHARACTERISTICS OF RESPONDENTS WITH AND WITHOUT SHARPS INJURY EXPERIENCE

Characteristic	With sharps injury (n)	Without sharps injury (n)	Statistical values [†]
Grade			$p = 1; \chi^2 = 0$
– Consultants	62	162	
– Non-consultants*	18	47	
– N/A	6	27	
Years spent in ENT			$p = 0.399; \chi^2 = 0.506$
– ≤20 years	49	115	
– >20 years	32	94	
– N/A	5	28	
Subspecialty			$p = 0.159; \chi^2 = 7.95$
– General	18	58	
– Otology	24	49	
– Head & neck	15	43	
– Rhinology	9	30	
– Paediatrics	3	11	
– Other	7	5	
– N/A	10	25	

*Non-consultants include specialist trainees, specialist registrars, associate specialists and staff grade doctors. [†]Analyses performed with chi-square (χ^2) tests. N/A = not available

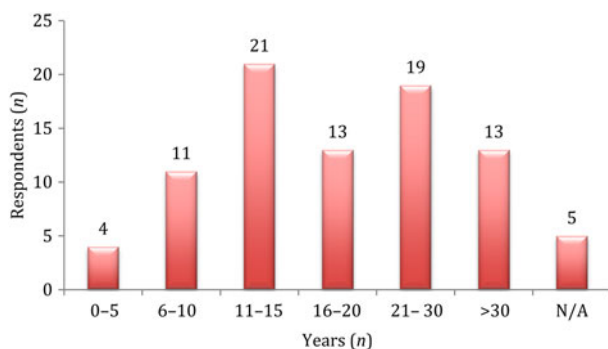


FIG. 2

Number of years that respondents with sharps injuries had spent in ENT. N/A = not available

TABLE III
COMPARISON OF SHARPS INJURY REPORTING BETWEEN CONSULTANTS AND NON-CONSULTANTS

Sharps injuries reported?	Respondents (n)
Yes	29
– Consultants	25
– Non-consultants	4
Occasionally	14
– Consultants	10
– Non-consultants	4
No	16
– Consultants	15
– Non-consultants	1
No answer	27

Analyses (for respondents who answered question) performed using Fisher's exact test; $p = 0.279$.

Blood-borne virus transmission

Fortunately, none of the respondents suffered any blood-borne virus transmissions that seroconverted. One respondent felt unwell from taking HIV prophylaxis.

Discussion

In the first ever UK study investigating sharps injuries within ENT surgeons nationally, we found an incidence rate of 26.6 per cent amongst 323 respondents. The vast majority of respondents (69.7 per cent) had experienced between zero and five incidences over the last year. Although no seroconversions were reported, worryingly only 33.7 per cent of afflicted clinicians had reported all their injuries and followed their local institution policies. We were also surprised to find a severe lack of publications on this topic worldwide, with most of the studies conducted more than 20 years ago.

The incidence of sharps injuries amongst our cohort appeared to be lower when compared to other studies conducted in the UK. A survey by Thomas and Murray on 75 surgeons in varying specialties, working within a 687-bedded large district general hospital, found that 44 per cent of respondents had suffered from sharps injuries within a 6-month period.⁴ Similarly, a paper by Au *et al.*, published in 2008, revealed 840 sharps injuries amongst 42 surgeons in Kent, with general surgeons experiencing 60 per cent of the injuries (Table I).⁸

There are several possible reasons for the differences in incidence between our study and the aforementioned previous studies. Being a predominantly out-patient based specialty, ENT surgeons may be less likely to encounter sharp instruments as frequently as some of the other surgical specialties. Most of our clinic-based procedures involve the use of a microscope and suction device, flexible nasoendoscope, and silver nitrate cautery sticks, which are unlikely to cause sharps injuries. In addition, many of our surgical procedures are conducted inside narrow orifices where blunt dissection is commonly preferred (e.g. cold steel dissection during tonsillectomy, elevation of tympanomeatal flap during middle-ear surgery and removal of inflammatory tissue in sinus surgery). Furthermore, we cannot discount the fact that the injuries may have been underreported, influencing our incidence rates.

A lack of reporting and poor adherence to local policy seems to be a recurrent finding in most studies conducted on this topic, and actual numbers may be up to 10 times higher.¹³ Four UK studies on sharps injuries amongst surgeons found that documented reported rates were less than 60 per cent, with one study quoting figures as low as 2.26 per cent (Table I).^{2,4,8,14} Commonly cited reasons for this include a cumbersome reporting process, a lack of user-friendly instructions, inadequate time and out-of-hours access, and the perceived low risk of blood-borne virus transmission.^{4,8,12} Although not directly

assessed, it is possible that the low percentage seen within our cohort may be based on similar grounds.

Whilst we found no differences in terms of reporting rates between varying grades of ENT surgeons (Table III), Au *et al.*⁸ and Adams *et al.*² noted that junior doctors were more likely to follow local policies and advice in comparison to senior surgeons. A similar finding was observed in a survey by Maiberger *et al.* of US ENT residents, where the reporting rate was 65.8 per cent.¹² This is somewhat encouraging as it may signify a more occupational health conscious and adherent future workforce, which can only bring positive effects to themselves and the healthcare sector.

Within the NHS, awareness and training on sharps injuries has been made a mandatory aspect of staff continual professional development, in line with the Health and Safety (Sharps Instruments in Healthcare) Regulations.⁷ In addition, clinicians who are new to a trust are required to undergo various induction programmes to ensure they are familiarised with the local sharps safety policy and reporting process.¹⁵ However, with each healthcare organisation having variations in their policy, trainees who rotate frequently can find this confusing and may be deterred from complying with local regulations.² One possible way forward is to streamline the reporting process across the NHS, making it effortless for both senior and junior clinicians. Such a system could be made available online, with the involvement of the various royal colleges and linked to local occupational health departments. Aside from addressing low reporting rates, this would help to create an efficient audit trail, which may serve the Health Protection Agency well.

Efforts to reduce the incidence of sharps injuries are ongoing. Since the 1980s, the concept of 'workplace safety climate' has been one focus of intervention.¹⁶ This involves addressing the perceptions that employees share about the safety of their working environment, which is critical to help elucidate the underlying safety culture of a work unit.¹⁶ In 2000, Gershon *et al.* developed a validated set of questions to investigate the association between hospital safety climate and exposure to blood-borne pathogens.¹⁷ The questionnaire, the Hospital Safety Climate Scale, comprises six dimensions: (1) senior management support for safety programmes, (2) absence of workplace barriers to safe work practices, (3) cleanliness and orderliness of the work site, (4) minimal conflict and good communication amongst staff members, (5) frequent safety-related feedback and training by supervisors, and (6) availability of personal protective equipment and engineering controls.¹⁷ Further studies conducted by Smith *et al.* using the Hospital Safety Climate Scale found strong associations between hospital safety climate and sharps injuries amongst healthcare professionals in China and Japan. The authors concluded that attention to the aforementioned dimensions is critical in reducing sharps injuries in a hospital environment.^{16,18}

More specifically, there is good evidence to show that the introduction of blunt suture needles and safety cannulas has had great impact in advancing sharps safety.^{7,13} Additionally, the provision of sharps containers, regulations to avoid the recapping of needles and the use of personal protective equipment are equally vital feats.⁷ Although double gloving is recommended, we found insufficient and conflicting evidence on its role in reducing instrument penetration of skin during surgical procedures.^{2,11} Other common culprits of sharps injuries include butterfly needles, glass ampoules, hollow-bore needles and insulin needles.¹⁸

- **The incidence rate of sharps injuries amongst 323 UK ENT surgeons was 26.6 per cent**
- **The reporting rate of such injuries is poor, as noted in other surgical specialties, and measures to improve this are needed**
- **Limited studies have been conducted on this topic worldwide**
- **Our findings serve as a stepping stone for future work, and increase awareness on the importance of appropriate sharps handling and reporting within ENT**

We acknowledge that the robustness of our questionnaire could have been improved to gather more focused information. Specifically, questions on the individual number of sharps injuries amongst respondents, and the resultant consequences on both staff (physical and psychological) and healthcare institutions may shed further light on the effects on ENT as a specialty. As our questionnaire was part of a wider survey, we were keen to keep it as short and simple as possible to encourage a better response rate. We were, however, pleased that we successfully acquired most of the vital information comparative to other UK studies on sharps injuries. In addition, we were fortunate to gather a much larger number of respondents in contrast to these studies.

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Address for correspondence:

Mr Ananth Vijendren,
1 Oyster Close,
Barnet EN5 2PP, UK

E-mail: shivan5@yahoo.com

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