

Did I Always Have a Hole in My Glove? Prevalence and Reporting Practice of Needle Stick Injuries amongst Healthcare Workers in District Hospital

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Abstract

Background: Needle stick injuries (NSI) carry the risk of transmitting blood-borne viruses. Changes in legislation have led to the use of safer instruments, mandatory training and outlined protocol to follow in the event of an NSI. Despite such efforts to minimize the occurrence, the number of NSIs remains at large.

Methods: Data was collected via an anonymous online retrospective survey over two months. This a single center studies in a UK district hospital.

Results: From 438 healthcare workers, 69 responses were collected. Data identified one third (n=23) of respondents had experienced at least one NSI while working at the Hospital. 42.88% (n=9) did not report at least one of their sustained NSI quoting reasons such as paperwork, perceived low transmission risk and NSI stigma. Surgical consultants, medical consultants and nurses experienced the highest number of NSIs respectively. Also, female staffs were ten times more likely to report NSIs compared to male staff.

Discussion: Familiarity with Hospital policy can be linked to an increased likelihood of reporting; staff who did report was the most familiar with the policy. However, familiarity did not ensure consistent reporting on all occasions. Out of 54, only 18.52% (n=10) of respondents mentioned the correct first aid measure. These, along with other staff suggestions, are areas that need improvement. Related stigma could explain avoidance towards reporting, as protocol requires lengthy paperwork and involvement of other staff. Surgical specialties remain mainly at risk for NSIs and worth further investigation.

Conclusion: Findings concluded prominent under-reporting and various similarities with existing literature. Policies need to be more transparent and easily accessible to staff. Better reporting practice will lead to the identification and implementation of improved safety measures.

Keywords: Needle stick injuries; NSI stigma; Healthcare; Human immunodeficiency virus; Cytomegalovirus; Nursing

Background

Healthcare workers are at high risk of needle stick injuries (NSIs) due to the nature of their work. They are exposed to transmissible pathogens daily, which is why measures are in place to minimize the risk of transmission. Nonetheless, NSIs still carry the greatest risk of transmitting blood-borne viruses, namely Hepatitis B, C and Human immunodeficiency virus (HIV); following a NSI, the risk of infection is 1 in 3, 1 in 30 and 1 in 300, respectively.^{1,2} Other infectious agents include malaria, prions, Epstein-Barr virus, Cytomegalovirus, transfusion-transmitted virus and Parvovirus B19 amongst others.² A report published by the Health Protection Agency in 2012, between 2002 and 2011, revealed NSIs in the medical and dental professions increased by 131%. Implying either NSI incidence is increasing or awareness and reporting have improved. In the medical field, nursing staff reported the highest number of NSIs (237 between 2002 and 2011) and 72 reports were from ancillary staff members, who have no contact with patients - this is a reflection of poor compliance with safe needle/sharp disposal by medical staff. Thirty-six of these NSIs were due to hollow-bore injury, which accounts for the most commonly reported NSI amongst healthcare workers. In 2011, 43% of reported NSIs (162/379) occurred on the ward, 17% (n=64) in theatre and 7% (n=28) in A&E [1,2].

The second most common healthcare setting where NSIs occur is in theatres. According to several studies, healthcare workers stated perceived low-risk of the patient and time needed to complete paperwork as the main reasons for not reporting NSIs. There are debates on whether the surgical experience is a risk factor for NSIs, but

irrespective of this, it is evident that NSIs in theatre are under-reported, with one study stating in a two-year period during which 840 NSIs occurred, only 2.26% (19/840) were reported [3-5].

UK Health and Safety Regulations 2013

Legislation for the use of medical sharps was initially transcribed in May 2010 by several bodies including the Royal College of Nursing (RCN), National Health Service (NHS) employers, UNISON and the Safer Needles Network. At that time, this directive aimed to achieve the safest possible working environment for healthcare workers and minimize all risks. Local hospital trusts fulfilled these aims by creating policies on risk assessment and risk protection. Mandatory training sessions allowed raising awareness, providing information on the risks, and a step-by-step guide on the protocol to follow in the event of a sharp injury occurring [6].

These national guidelines became United Kingdom (UK) legislation by 11 May 2013, and all hospitals in the UK had to comply

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with these regulations for employers and employees before this date. The government spent an estimated cost between £5.2 million and £6.8 million to implement control measures, training, and replace sharp equipment in the NHS. The guidance starts by establishing which employers in the healthcare setting are to take action on the regulations, including disposal and reducing the unnecessary use of sharps. These employers are primarily involved in healthcare management or are contractors working for the Trust. Unnecessary use of sharps, addressed in regulation 5(1) a, underlies the role of the employer to provide needle-free equipment for otherwise sharp-avoidable procedures. External organizations have reviewed and identified staff members using needles to carry out tasks which do not require needles.

One of the main points in Regulation 5(1) (b) describes the use of "safer sharps" to substitute the traditional and unprotected sharp devices. The term "safer sharps" means medical sharps that incorporate mechanisms to minimize the risk of accidental injury. A range of needles and syringes are now available with a protective shield that can either slide or pivot over the needle after use.

The legislation thoroughly illustrates the guidance that should be given to employees. The information must cover the risks from injuries involving medical sharps, good practice in preventing injury and be aware of the support available to an injured person from his/her employer. In regards to employee training, regulation (6)4 states that employees must know how to dispose and safely use medical sharps and what to do in the event of a sharp injury. This information can be provided on posters, safety guides and displayed on intranet employer websites.

In the event of an injury, employees must take specific actions and follow procedures set in place. When an incident occurs, it is pivotal that the employee notifies the employer as soon as practicably possible, and the incident is recorded and investigated. The employee must provide information to the employer on the incident; when, where and how the incident occurred; to allow an investigation to happen. In the case of an injury which may have been exposed to a blood-borne virus, the source of the virus should be investigated. If this is known, patient confidentiality should be maintained, and the appropriate treatment should be received by a medical professional. Treatment should cover immediate access to medical advice, post-exposure prophylaxis, counseling and any other medical treatment as advised by the doctor [7].

For any successful health and safety management regime, it is essential to review the procedures in place at suitable intervals. The regulations require the employer to gather information on the degree of compliance with the relevant procedures and report areas where procedures are inadequate.

Barnsley Hospital NSI policy

About us

This study observed the reporting policies at a District Hospital, in England. The hospital has over 350 beds and serves a population of more than 250,000 within the Metropolitan Borough⁸. The hospital was chosen for this study as the authors are based here for clinical placement.

The Hospital Trust has a standard procedure for any contamination incident, which includes NSIs and sharps injuries. This is documented in the 28-page Occupational Health and Wellbeing Services (OHWS) Contamination Incident Policy [8]. The policy is accessible to all staff and is located on the intranet under the local OHWS and Policy

Warehouse. It contains a flow chart outlining the protocol to follow in the case of any contamination incident. Risk assessment forms 1 and 2 are also available on both websites. All new staff is briefed on this procedure during staff induction within the first three months of employment by the Infection and Prevention Control Team.

Upon sustaining a NSI or sharps injury, it is first recommended that the staff member follow the appropriate first aid procedure. This is outlined in the sharps/contamination injury poster located on the hospital's infection control site. The injury should be reported to the manager or other senior qualified professional who will evaluate the incident and take necessary measures. This includes the safe disposal of the offending sharp or needle stick and completion of Assessment form 1 to determine whether a significant exposure has occurred m [9].

The source patient should be identified when a significant exposure has occurred. The clinician on duty responsible for the source patient should assess the patient and complete Assessment form, which identifies if they are deemed low or high risk. According to the Contamination Incident Policy, high-risk incidents are those with patients that are considered to have risk factors for or are known to be HIV, Hepatitis B or C positive. Injured staff members that are non-immune to Hepatitis B are also considered high risk [10].

It is advised that the staff member sustaining the injury, whether from a low or high-risk source patient, should attend the OHWS during operational hours. Ideally, the staff member should report to OHWS within one hour of the injury, taking completed Assessments forms 1 and 2 with them. OHWS will advise on the management in the acute setting and where required, obtain blood samples, refer to the Emergency Department (ED) for any prescribed medications including post-exposure prophylaxis, and arrange to follow up care.

High-risk injuries occurring outside working hours should be reported to the (ED) and followed up with OHWS the next working day. However, out of hours, high-risk incidents regarding Hepatitis C source patients should be seen in OHWS during the next working hours [11].

If the source patient is unknown, then the protocol still applies, including attendance to OHWS and ED if considered a high-risk patient and the incident occurred out of hours.⁹ we aimed to assess the prevalence of NSIs amongst health care workers in the Hospital alongside reporting rates. We further aimed to investigate current reporting practice along with pre-existing knowledge of the reporting policy at our Trust [12].

Methods

An anonymous retrospective survey was sent to all health care workers. This included nurses, doctors, medical students, student nurses, auxiliary staff, physician associates, nurse associates, health care assistants, midwives, operating department practitioners, phlebotomists, pharmacists, dieticians, occupational therapists, physiotherapists, technicians, domestic staff, non-clinical administrators, and volunteers. Respondents were asked their gender, grade and age; age was divided in chronological 9-year increments. The survey was available from January 2020 to February 2020.

In the survey, Needle stick injury was defined as any incident that caused a puncture to the skin.

Our survey was then divided into four sections: NSIs sustained; knowledge of reporting policy at our Trust; current reporting practice undertaken by staff; and improvements and suggestions [13-15].

In the first section, we assessed whether or not respondents had sustained a NSI while working in the Hospital: and if so; how many, the mechanism of injury, factors contributing to the cause of injury, whether or not it was reported, and what the consequences of the injury were. In the second section, we investigated how familiar the hospital staffs are with the current policy regarding NSIs at our Trust. Familiarity was assessed using a 1-5 Likert scale: 1 = not familiar and did not know what to do; 2 = not familiar but know what to do; 3 = familiar and know what to do but need assistance; 4 = quite familiar and do not need any help; and 5 = very familiar and can help others with reporting [16-17].

The third section investigated the current reporting practice by investigating the reasons for not adhering to the hospital's reporting policy when NSIs were sustained. These three sections of the survey were designed by asking categorical questions that were answered by selecting a response that the participant deemed most suitable. The final section of the survey allowed participants to openly suggest ways to improve education and awareness of NSI reporting at our Trust [18-19].

Before sending the survey out to our target population, a pilot study was conducted to ensure we had highlighted the significant concerns of NSI-reporting. This included the distribution of our draft survey to the local medical education manager and a small number of medical students and doctors. The librarian facilitated the survey design process so that questions were structured, clear, and coherent. This helped optimize the time we were requesting of the participants to fill out our survey. Our study considered statistically significance at a p-value < 0.05 [20].

Results

Demographics

The online survey was sent to a total of 438 health care workers. There were 69 responses collected, giving a response rate of 15.75%. Out of 69 responders, 30.43% (n=21) were male, 68.12% (n=47) were female and one preferred not to say. The majority of our responders, 40.58% (n=28), were aged between 45-54 years.

The responders were made up of 60.9% (n=42) doctors, 29% (n=20) nursing staff, and 10.1% (n=7) medical students. The breakdown of the different grades can be seen. The majority of doctors who responded were consultants (n=27), and from the nursing staff mostly lead nurses (n=6) and matrons (n=6). In the breakdown of grades, we included Obstetrics and Gynecology as surgery, Anesthesiology as medicine, and combined Foundation years 1 and 2. Of the 69 responders, 10.14% (n=7) work in theatre daily, 18.84% (n=13) work in theatres more than once a week, 13.04% (n=9) less than once a week, and 57.97% (n=40) not at all.

Needle stick injuries

One third (n=23) of responders had experienced an NSI while working Hospital. The breakdown of gender and grade can be seen in Table 1. Surgical consultants had the most NSIs, followed by medical consultants and lead nurses. Consultants/Specialty doctors had a 6% increased likelihood of acquiring an NSI than doctors currently in training (Odds ratio: 1.06, P=0.934) and doctors have a 7% increased chance of sustaining a NSI than Nurses (Odds ratio: 1.07, P=0.904).

The number of NSIs sustained per respondent ranged from a minimum of 1 to a maximum of 4. The mean for the amount of NSIs sustained was 1.64 (95% Confidence Interval (CI) 1.26 - 2.02),

with a standard deviation of 0.9. Sixty-five per cent (n=15) of the 23 respondents reported an NSI at least once, and one person did not specify whether they had reported or not. The breakdown of gender and grade can be seen in Table 1. The overall reporting rate was calculated to be 65.22%. Our study found out that females were ten times more likely to report needle stick injuries than males (Odds ratio: 10, P=0.046). Females reporting rate was 80% compared to that of males reporting rate of 28.57%. 4 out of 5 consultants are likely to report an NSI when sustaining an injury; however, nurses were more likely to report compared to doctors. Nursing staff reporting rate was 71.43% compared to doctors 66.67% (Table 1).

Only 14 people answered whom they would contact following an NSI. The response was equally distributed between OHWS and the ED. Only one responder disclosed that they had to take prophylaxis after their NSI incident. Only two responders admitted that they had had an NSI in 2019 and only one of them reported it. A suturing needle caused both injuries. One was due to feeling rushed and the other as a result of someone else's mistake.

Near the end of our survey, we asked our responders what they would do in the case of NSI and had a response rate of 78.2% (n=54). We collected all the responses and made a chart from the things that were mentioned. The most common answers were cleaning the wound and letting the wound bleed. Most stated they would report the NSI or go to OHWS or ED.

Reporting policy

One of the aims of this survey was to assess the familiarity of the NSI policy by hospital staff; we used the Likert scale of 1-5 for this. Our responders were quite familiar with the policy: we pooled the answers of 3 different groups and calculated the mean and standard deviation from 67 responders who answered this question, Table 2. The overall mean was 3.55(95% CI (3.25, 3.85)) with a standard deviation of 1.26. The first group consisted of 46 staff members who had never had an NSI and were the least familiar with the hospital policy (mean of 3.37 (95% CI (3.01, 3.73)) and a standard deviation of 1.24.

Our second group included seven staff members who had not reported a NSI at least once but were more familiar with the policy compared to the first category (a mean of 3.57 (95% CI (2.45, 4.69)) standard deviation of 1.51). Our last category consisted of 14 staff members who were the most familiar with the hospital policy before reporting the NSI and had reported at least one NSI (mean of 4.14 (95% CI (3.56, 4.72)) standard deviation of 1.10) (Table 2).

Reporting practice

This survey discovered that 13% (n=2) of respondents who have reported (n=15) their NSI omitted reporting in at least one instance. When queried why people who had sustained a NSI had not reported; nine respondents explained what influenced them not to report. Low transmission risk being the most common explanation (88.89% (n=8)) followed by non-bleeding injury and paperwork as the reason they did not report their NSI. We also asked all the responders if they felt there was a stigma around needle stick injuries to which 55 responded. The majority responded no; however, 47.27% (n=26) acknowledged existing stigma.

Improvements and suggestions

At the end of the survey, we asked how NSI reporting can be improved, to which 48 people responded. Answers were diverse but with underlying commonalities: the reporting process should be made

Table 1: Breakdown of Needle stick injuries and reporting of the incidents based on gender and grade.

	Needle stick injuries in (N=23)	Reported Needle stick injuries (N=15)	Reporting rate of Needle stick injuries
Gender			
Male	7	2	28.57%
Female	15	12	80%
Did not specify	1	1	100%
Position			
Doctors	15	10	66.67%
Nursing staff	7	5	71.43%
Medical student	1	0	0%
Total reporting	23	15	65.22%

Table 2: Familiarity of The Hospital NSI Policy amongst 3 different answer groups.

Familiarity of Hospital Needle stick reporting Policy	Familiarity without having an NSI (N=46)	Never reported an NSI (N=7)	Familiarity of NSI prior to reporting (N=14)	Total (N=67)
1. Not familiar and don't know what to do	2	0	0	2
2. Not familiar but know what to do	11	3	1	15
3. Familiar and know what to do but need some assistance	13	0	4	17
4. Quite familiar with the policy and don't need any help	8	1	1	10
5. Very familiar with the policy and can help others with their reporting	12	3	8	23
Mean, 95% CI	3.37 (3.01, 3.73)	3.57 (2.45, 4.69)	4.14 (3.56, 4.72)	3.55 (3.25, 3.85)

more accessible; simpler datix; go through the policy during induction¹ and make the policy more transparent. At the very end, we asked if responders would like more education and awareness on the hospital policy, with our results; 51 people responded. Posters and information leaflets were popular suggestions.

Discussion

This survey aimed to find out how familiar Hospital staffs are with the Needle stick Injury Policy if there was any under-reporting on NSI incidents and reasons for this.

Demographics

Despite a response rate of 15.75%, the overall reporting rate was only 65.22%. It is hard to judge whether this is due to a small sample group or if this is an actual representation of reporting practice in the Trust. We do still believe the finding supports our theory on NSIs being under-reported and demonstrating consistency with other studies^{11, 12} as the majority of our respondents were familiar with the reporting policy. This survey discovered that there was no consistency with reporting practice as some staff members admitted not reporting all of their incidents; this further solidifies under-reporting.

Prevalence and reporting of needle stick injuries

Nursing staff and female gender were more likely to report compared to doctors and male gender; this is also consistent with existing data^{13, 14}, bearing in mind that the response rate was relatively low to generalize this statement to the single center in the UK. Doctors were more likely to sustain NSIs than nurses which are found in previous studies as well.¹⁵

From 69 responders, mainly consultants sustained NSI. To clarify, more consultants replied to this survey compared to other staff members, more specifically, surgical consultants (as seen in Table 1). Surgical specialty is a significant risk factor for NSI; with injuries six times greater compared to non-surgical staff due to the nature of their

roles¹⁶⁻¹⁹. This can be due to the lack of safety mechanism in suturing needles in comparison to those incorporated into phlebotomy needles and cannulas. Even though surgery may lack the safety mechanisms, they do have safety measures in place to handle sharps and operative equipment to minimize the sharps incidents.

It is also not thought to be time-efficient to report all incidents in theatre as this can cause interruptions or rescheduling of surgeries.²⁰ Regardless it is vital to encourage theatre staff to report all their incidents. This might pinpoint the causes of sharps injuries in surgical specialties, furthermore aid in the improvement of safety measures and safer equipment.

Reporting policy

The majority of our hospital staff was familiar with the policy, and most were confident enough to help others if need be. Our study found that the more familiar person was with the policy, the more likely they were to report their incidents. The study also discovered that people who had sustained a needle stick injury were more familiar with the policy than who had never sustained a NSI. Make a point about how familiarity is linked to reporting, not sure if it is from experiencing a NSI or they were familiar with policy beforehand.

Even though our sample group was thought to be familiar with the NSI policy, only 18.52% (N=10) of 54 responders described the correct first aid measure; however, the majority knew to contact either ED or OHWS. More education is needed on appropriate first aid following a NSI, as there were many discrepancies in the answers.

Reporting practice

In previous NSI studies, the most common reasons for under-reporting were low transmission risk, amount of paperwork as well as an injury not bleeding^{13,17 20}. This is consistent with our findings as well.

Looking at the Hospital's sharps policy outlined above, we found it is not straightforward, and many variables affect the process.

Involving 2-3 other staff members to report any sharps incidents might be intimidating to some people, especially when concerned with the stigma surrounding NSI. The Trust requires 1-2 forms to discover whether the incident was significant or not, which can be perceived as too much admin work and discourages staff from starting the process in the first place. The policy and the forms are found in the Trust's intranet; however, 6% (n=5) out of 48 responders suggested having more straightforward access to intranet to find the policy which implies that it is not as readily available as it should be. Easier access to the policy and reporting, as well as annual sessions regarding NSI, would prompt more people to report incidents. The most suggested option was posters around the hospital by 32% (n=27) of our responders

Education and awareness are essential to provide as NSI stigma remains prevalent, as suggested by our results: 47.27% (n=26) out of 55 responders believe there is still stigma affecting reporting rates. There have been previous studies around the stigma of NSIs and fear of reporting, which can be diminished with adequate education and awareness.^{17, 20}

Improvements and suggestions

More education is needed regarding NSI reporting policy - with the recommendations mentioned above; reporting can be immensely improved. An annual audit is strongly recommended to re-evaluate the progress. Furthermore, revising the Trust's policy would be beneficial in reducing under-reporting practice.

Limitations and strengths

The anonymity of the study allowed responders to be more open in completing the survey. The survey was kept relatively short to maximize completion rates and survey progression was based on answers to previous questions, ensuring responders only answered questions relevant to their NSI exposure.

We were able to stratify our data based on specialization and grade of health professions. Observation bias was eliminated by including all data collected without exclusion criteria. The main limitation of this study was the small sample size. Obtaining more responses would have made our results more representative of Needle stick incidences in the Hospital as well as potentially other district hospitals across the UK. Recall bias was inevitable as staffs were asked about past incidents that occurred some questions were not specific and was let to responder's interpretation which does not give consistent and accurate data.

Conclusion

Our findings match those of previous studies in terms of under-reporting NSI rates; our reporting rate was sub-par at 65% when ideally it should be 100%. Reasons justifying under-reporting included; stigma around NSIs, time-consuming paperwork to complete and perceived low-transmission risk from patients, all of which coincide with existing literature. Despite safety measures implemented following the UK legislation change in 2013, surgical staff members remain at most significant risk of sustaining NSIs according to our results, especially consultants. This should be further explored to determine which preventative measures can be implemented, or strengthened if already in place. Another matter worth investigating is the considerable discrepancy in gender reporting rates - women are ten times more likely than men to report a NSI.

The elaborate Hospital specific reporting policy may be contributing to under-reporting rates. More importantly, more awareness is needed on first aid precautions following a NSI, as well as reporting policy;

respondents suggested improvements in the form of flyers, posters and annual information sessions. To ensure a safer working environment for all medical staff members, including ancillary (who do not have patient contact), improving reporting rates is paramount.

Abbreviation:

- CI - Confidence interval
- ED - Emergency Department
- HIV - Human immunodeficiency virus
- NHS - National Health Service
- NSI - Needlestick injuries
- OHWS - Occupational Health and Wellbeing Services
- RCN - Royal College of Nursing
- UK - United Kingdom

Declarations

Conflicts of interest

All authors declare: "no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work."

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Ethical approval

All ethical guidelines have been adhered to. This study did not involve the active participation of patients. Approval was obtained from Barnsley Hospital Research Governance.

Gurantator Jerocin Vishani Loyala, the lead author (Jerocin Vishani Loyala) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Contributors

Jerocin Vishani Loyala contributed to the study idea, execution, survey design, data interpretation and writing the data. Bisma Hussein, Gaurav Pydisetty, Athena Michaelides, Melina Mahr All contributed to the data collection, writing and revision of the manuscript. Each author agrees that he/she has full confidence in the accuracy and integrity of the work contributed by the other group authors.

Data sharing

The raw data is available from the corresponding author on request.

Consent for publication

Consent was received from all the participants for the publication of this manuscript.

Author's information: This article was done in Barnsley Hospital as we were based there during our 5th and 6th year of Medical school, for our clinical placements.

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