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Investigating the incidence and type of sharps injuries within the nursing student population in the UK

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The incidence and type of sharps injuries within a nursing student population in the UK

Abstract

Aims

The aims of this study were to identify the incidence and type of sharps injuries within a nursing student population within the UK

Background

Evidence suggests that nursing students sustain sharps injuries across the world, but there is no evidence of data from the UK.

Design

A survey was conducted.

Methods

Using volunteer sampling a survey was administered to nursing students (n=1015) within a University and then utilising snowball sampling via social media, the survey was distributed to nursing students nationwide. Datasets from 1015 nursing students were available for analysis. The research was reported adhering to the STROBE guidelines.

Results

Sharps injuries were most likely to occur with glass ampoules, when preparing injections and in the 2nd year of the programme. Contributing factors of the sharps injury were identified, with inexperience being the primary cause. Some nursing students reported psychological impacts after sustaining the sharps injury.

Conclusion

The study concluded that sharps injuries are common within nursing students, and can have many psychological impacts on the individual.

Relevance to practice:

Nursing students in the UK sustain sharps injuries in many different types of placements within acute and community settings. Glass ampoules if the most common cause of a sharps injury with inexperience being a major contributing factor.

Keywords:

Survey; sharps injury; nursing student; questionnaire

What does this paper contribute to the wider global clinical community?

A proportion of nursing students in the UK sustain a sharps injury every year, with glass being the most common cause. Some sharps injuries occur when inexperienced nursing students are not being observed by a mentor. Hence, many go unreported. Some nursing students suffer the psychological effect of Post Traumatic Stress Disorder following a sharps injury and may need additional support.

Introduction

This study aimed to explore the incidence and type of sharps injuries within pre-registration nursing students. Although sharps usage is an imperative and essential clinical skill for all nursing students, how many sharps injuries occur and what impact these injuries have on the individual remain under-explored within the UK. Many studies have been conducted which investigate sharps injuries within Registered Nurses and other healthcare workers in the UK, but an exploration into nursing students within the UK remains elusive.

Sharps injuries can be defined as

> *"…skin penetrating stab wounds caused by a sharp instrument and accidents in a medical setting."* (Centers for Disease Control and Prevention, 2008)

Definitions of sharps within healthcare are wide and varied (Hersey and Martin, 1994). The following is not designed to be an exhaustive list, but an outline of items, defined as 'sharps', that have been reported to have caused sharps injuries to healthcare workers:

- blood collection needles (Royal College of Nursing (RCN), 2013)
- bone fragments or teeth (Riddell and Tong, 2015)
- broken glass (Health and Safety Executive (HSE), 1995)
- emergency services' cutting equipment (HSE, 1995)
- instruments used in invasive operations, surgery (Hersey and Martin, 1994), dentistry and acupuncture (HSE, 1995)

- intravenous (IV) cannulas, or needles used to connect parts of IV delivery systems (RCN, 2013)
- jagged metal (HSE, 1995)
- lancets (WHO, 2003)
- needles such as hypodermic (Muralidhar et al., 2010) and hollow bore (WHO, 2003)
- razors (RCN, 2013)
- scalpels (WHO, 2003)
- scissors (RCN, 2013)
- winged steel needles, known as butterfly needles (RCN, 2013)
- other medical instruments that are necessary for carrying out healthcare work (HSE, 2016)

Sharps injuries, can transmit up to 60 types of pathogen (Tarantola et al., 2006) to the injured party. Whilst up to 100% of some nursing student populations sustain sharps injuries (Trivedi et al., 2013), a dearth of research studies investigating the topic worldwide exist.

Background

The reported incidence of sharps injuries involving nursing students worldwide is wide-ranging. In a study by Cheung et al (2012) an incidence rate of 5.9% (n=52) of sharps injuries was found, whilst Trivedi et al (2013) found the rate to be 100% (n=100). In the numerous studies reporting the incidence worldwide, the timeframe for reporting ranged from the previous week (Kermode et al., 2005) to the entire academic training period (3 or 4 years) (Small et al., 2011).

Studies have investigated the most common stage of student nurse training when sharps injuries occur (Albertoni et al., 1992; Smith and Leggat, 2005; Petrucci et al., 2009; Talas, 2009; Mitra et al., 2010; Small et al., 2011; Ozer and Bektas 2012; Unver, 2012). Findings from these studies suggest that the 2nd year of study is the stage in which the incidence rates for sharps injuries is highest within the nursing student population.

The type of device involved in nursing students' sharps injuries with the highest incidence was intravenous needles at 86% (n=86) (Trivedi et al., 2013). This was followed by needles (insulin, hypodermic, hollow-bore) with 80.8% (n=55) (Hussain et al., 2012). Glass items (bottle of patient secretion, blood collection tube, broken ampoule) were also reported with the highest incidence being 66% (n=33) (Karadag, 2010).

When exploring the most frequent time to have a sharps injury during the administration of an injection, the stage with the highest incidence is 'when re-capping the needle' with 62.5% (n=40) (Muralidhar et al., 2010). This is followed by 'after administration but before disposal of the needle', with the highest incidence being 61% (n=39) (Muralidhar et al., 2010). This study was conducted in India where stringent industrial legislation has not been fully implemented or regulated (Agnihotram, 2005) due to issues with resources (Gramling and Nachreiner, 2013).

Worldwide some data exists regarding the incidence of sharps injuries, although these studies have been primarily conducted within hospital settings. There is a lack of evidence regarding sharps injuries within nursing populations within the UK, relating to the incidence, the type and the location of injuries. The purpose of this study is to identify the incidence and type of sharps injuries sustained by nursing students.

Aims

The aim of the study was to explore the incidence and type of sharps injuries within a nursing student population within the UK.

Methods

Design

A survey was designed and administered locally and nationally to nursing students using convenience and snowball sampling (Polit and Beck., 2010). The STROBE checklist for reporting cross-sectional studies was adhered to (see Supplementary file 1).

Participants and data collection

For the local survey, a convenience sample of pre-registration adult branch nursing students studying at a university in the UK were accessed (with permission) from a University database. Survey Monkey (2015) was utilised to construct the questionnaire and it was distributed to the nursing students via email.

For the national survey, social media was utilised to distribute the survey. Thus included via convenience sampling within nursing students interest Facebook groups and with snowball sampling via Twitter tweets. Facebook has many advantages within the research arena. Social networks have the potential to provide new opportunities for discovering prospective research participants (Walton, 2009) and sustaining contact with them during the research process (Amerson, 2011). Although seen as a new phenomenon, Twitter has been successfully utilised to recruit participants for research studies (O'Connor et al., 2014). This snowballing action of retweeting from follower to follower meant that a tweet can be seen by an extraordinary number of potential participants. Twitter has been found to be quick, cheap and efficient at reaching an abundance of research participants (Batey, 2018). The questionnaire link was distributed to nursing students between July to November 2015. This was because the nursing students had come to the end of the academic year. Demographic data collected included gender, age, University, previous experience in healthcare, and current academic year.

Measurements

A questionnaire was devised for the purpose of the survey based upon a systematic review and a review of available previous questionnaires exploring the same topic area. The questionnaire comprised of 18 questions namely:

1. Have you had a sharps injury in this current Academic year?
2. How many sharps injuries have you had in this current Academic year?
3. Did you report the sharps injury (injuries)?

4. Please state what device(s) were involved when you had the sharps injury (injuries).
5. Please indicate what procedure was happening when the sharps injury (injuries) occurred.
6. If the sharps injury (injuries) happened during an injection procedure, please state at what stage of the process the injury (injuries) occurred
7. Please state what time of day or night the sharps injury (injuries) happened.
8. Please state which shift you were working at the time of the injury (injuries).
9. Please state what you consider were the potential ‘causes’ or ‘contributing factors’ of the sharps injury (injuries)
10. Were you being directly observed by your Mentor, or a trained nurse, or a health professional, or a University Lecturer at the time of the sharps injury (injuries)?
11. Please state if the sharp involved in the injury (injuries) was ‘used’(contaminated) or ‘unused’ (sterile)
12. Please state the exact location where the sharps injury (injuries) occurred
13. Please state the ‘specialty’ of the placement where you had the sharps injury (injuries)
14. Please state if you reported the sharps injury (injuries)
15. Did you record the injury (injuries) on an accident form, or an incident form, or an electronic reporting system?
16. If you did not report the sharps injury (injuries), please state the main reason why you did not report the sharps injury (injuries)

17. Please state which part of your body was injured when the sharps injury (injuries) occurred
18. Are you right handed or left handed?

To determine the impact of a sharps injury, including Post Traumatic Stress Disorder, four questions were created. The Primary Care PTSD Screen (PC-PTSD Screen) (US Department of Veteran Affairs, 2013) was utilised for this purpose and very slightly adapted. Current research suggests that the results of the PC-PTSD should be considered “positive” if a person answers “Yes” to any three items.

19. In the month following the sharps injury (injuries) did you have nightmares about it or thought about it when you did not want to?
20. In the month following the sharps injury (injuries) did you try hard not to think about it or went out of your way to avoid situations that reminded you of it?
21. In the month following the sharps injury (injuries) were you constantly on guard, watchful or easily startled?
22. In the month following the sharps injury (injuries) did you feel numb or detached from others, activities or your surroundings?

For the national survey, two of the questions gathering demographic data were altered slightly. One additional question enquired which branch of nursing was being studied, namely Adult, Child, Mental Health and Learning Disability. This was to identify nursing students from a branch other than the Adult branch who completed the survey.

Additionally, for the response option for the question relating to the University at which the nursing student was completing the programme, there were no options given other than stating the name of the University.

To explore face validity the questionnaire was distributed to a Professor and lecturers in nursing on 9 occasions with only minor changes required. Content validity within this study was assessed with the employment of a Content Validity Index (Martuza, 1977). A content validity score of 100% was achieved after a review of the questionnaire by 10 pertinent nurse professionals. A Test-Retest of the questionnaire showed a 94.4% level of accuracy. Internal consistency reliability was also high and this was assessed the repetition of a question within the questionnaire. A small pilot study (n=22) was completed with minor grammatical corrections.

Data analysis

The completed questionnaires were obtained via Survey Monkey. The data was converted and then analysed utilising the software SPSS version 22 for Windows.

For each questionnaire descriptive statistics were performed in order to summarise the data, including frequency, mean and standard deviation. This is presented in a variety of tables. Chi-square and Fischer Exact Test were then employed in order to determine a significant difference between the expected frequencies and the observed frequencies in various categories. This choice of statistical test was dependent upon the sample size, sampling method, and the level of measurement. This aided the generalisation of the findings to equivalent populations (Parahoo, 2014).

Ethical considerations

Prior to agreeing to participate in Survey One (local), nursing students studying at a University in the UK received information within an email explaining thoroughly the purpose of the study and requesting their participation. This also formed the first part of the questionnaire to encompass participants in Survey Two (national).

The correct amount, level and extent of information was given to potential participants to enable them make an informed choice (Taylor, 2014). To aid openness and honesty, the contact details of the researcher were given in case the potential participant wanted to ask any questions which they may have about the study at any stage. The information also explained that the completion of the survey would mean that the participant was giving their consent to be part of the study. The participants were informed that participation was entirely voluntary and that they had the right to withdraw from the study at any time before the survey was completed. Students from the local University were informed that participation within the study, or refusal to take part, would have no bearing at all on their progress within the nursing programme which they were studying. There was no coercion or duress placed upon the participants in the light of the lecturer – student relationship which remained professional at all times.

The information given to potential respondents locally and nationally stated that due to the delicate nature of the study, counselling or support from their University services or GP should be sought if they felt that they had been psychologically harmed by the sharps injury. Because of the anonymous nature of surveys, it was not possible to

ensure this had happened. Before and following the interviews, this support was reiterated to participants.

The information stated that responses were totally confidential and anonymous, and that the survey was not a test of knowledge but the researcher was interested in the honest views and opinions of the participant. It was stated that this study had been approved by the Ethics Committee at the local University. Finally, potential respondents were informed that if they had any questions or concerns about the project, contact details of the researcher were provided.

Results

Sample characteristics

The local survey was distributed to 954 nursing students and had 544 responses giving a response rate of 57.02%. After incomplete questionnaires were removed, 537 questionnaires were available for analysis. The national survey received 471 responses. After the incomplete questionnaires were removed, the total for analysis was 274. As the questionnaire was distributed via social media commonly by snowball sampling, the response rate was unknown.

There were a similar number of respondents from each of the three years of academic study in Survey One (local). The mean age of the respondents was 28.44 years old and ranged in age from 18-54 years old. The vast majority of the respondents were female (92.4% n=496) having had previous experience of working within healthcare before

starting the Programme (63.7% n=342). Being a HCA or equivalent was the most common occupation (84.9% n=288).

There were more respondents in the second year of their academic study (40.5% n=111) and the mean age of the respondents was 27.88 years old in Survey Two (national). The ages ranged from 19-51 years old. The vast majority of the respondents were female (89.1% n=244) having had previous experience of working within healthcare before starting the Programme (59.1% n=162). Being a HCA or equivalent was the most common occupation 87.6% (n=151).

Initially the aim was to compare local and national data, but due to the homogenous nature of the respondents both locally and nationally, the survey data was amalgamated for analysis.

The incidence rate

The incidence rate of a sharps injury in the last academic year was 14.7% (n=119).

The academic year when the sharps injury was sustained

The most frequent academic year when a sharps injury occurred was in the second year of academic study (44.54% n=53), followed by the third year (36.1% n=43) and then the first year (19.3% n=23).

The number of sharps injuries sustained by respondents within the current academic year (n=116)

The vast majority of respondents who had sustained a sharps injury had had one sharps injury within their current academic year (89.66% n=104), whilst 8.62% (n=10) had sustained two, 0.9% (n=1) had sustained three and 0.9% (n=1) sustained more than five. There was no statistically significant association between the number of SIs sustained and gender (p=0.227, *FET*); academic year (p=0.711, *FET*); previous experience (p=0.847, *FET*) or being right or left handed (p=0.545, *FET*).

The time when the sharps injuries occurred

When analysing the individual injuries (n=135), the most common time that sharps injuries occurred was between 1200-1459 hrs (31.5% n=35), followed by 0900-1159 (27% n=30) and 1500-1759 (20.7% n=23). There was no statistically significant association between the time zone when the sharps injury occurred and gender (p=0.457, *FET*); academic year (p=0.564, *FET*); previous experience (p=0.786, *FET*) or being right or left handed (p=0.589, *FET*).

The type of shift when sharps injuries occurred

When analysing the individual injuries (n=135), the most common shift when sharps injuries occurred was on a ‘long day’ (65% n=76), followed by an ‘early shift’ (25.6% n=30). There was a statistically significant association between the type of shift and academic year (p=0.017, *FET*). There was no statistically significant association between the type of shift when the SI occurred and gender (p=0.650, *FET*); previous experience (p=0.279, *FET*) or being right or left handed (p=0.266, *FET*).

The exact geographical location of the sharps injury

The most common location for a sharps injury to occur was in the 'treatment room' (44.4% n=52), followed by the 'patient's bedside' (29.1% n=34), and the 'patient's own home' (8.5% n=10). In total there were 10 different locations where sharps injuries were reported. This data can be seen in Table 1.

Insert Table 1

There was no statistically significant association between gender (p=0.059, *FET*); academic year (p=0.787, *FET*); previous experience (p=0.276, *FET*) or being right or left handed (p=0.995) and the location of the sharps injury.

The specialty where the sharps injury occurred

The most common speciality where a sharps injury occurred was in a 'Medical' environment (26.3% n=30), followed by 'Surgical' (18.4% n=21) and 'District Nursing' (15.8% n=18). In total there were 15 specialties reported where sharps injuries occurred. This data is presented in Table 2.

Insert Table 2

There was no statistically significant association between the specialty where the sharps injury occurred and gender (p=0.966, *FET*); academic year (p=0.639, *FET*); previous experience (p=0.392, *FET*) and being right or left handed (p=0.520, *FET*).

Whether the nursing student was being directly observed when the sharps injury occurred (n=117)

In total, 78.6% (n=92) of sharps injuries occurred when the student was being observed by their Mentor. There was a statistically significant association between gender and whether the nursing student was being observed ($X^2(2) = 10.381$, p=0.006). There was no statistically significant association between whether the nursing student was being observed and academic year ($X^2(4) = 2.230$, p=0.694); previous experience ($X^2(2) = 1.541$, p=0.463) and being right or left handed ($X^2(4) = 0.987$, p=0.912).

The potential causes of the sharps injury

When looking at the individual sharps injuries (n=135), 116 responses were made regarding the potential cause. The most commonly mentioned possible cause was ‘inexperience’, followed by ‘lack of familiarity’ and ‘the equipment’. In total there were 16 potential causes mentioned. This data is presented in Table 3.

Insert Table 3

The part of body affected by the sharps injury

Most of the sharps injuries occurred to the hand (98.2% n=109). One injury occurred to the arm (0.9%) and one to the thigh (0.9%).

Was the sharps injury reported by the nursing student

When looking at the individual sharps injuries, 56.1% (n=74) were reported. There was a statistically significant association between reporting the sharps injury and being right or left handed ($X^2(2) = 8.936$, p=0.011) and academic year ($X^2(2) = 10.821$, p=0.004).

There was no statistically significant association between reporting the sharps injury and gender ($X^2(1) = 3.222$, p=0.073) and previous experience ($X^2(1) = 1.960$, p=0.161).

Reasons why the nursing student did not report the sharps injury

There were responses from respondents regarding why 80/135 sharps injuries were not reported. Respondents could give more than one response. The most common reason was because the sharp was ‘unused or clean’, followed by it being a ‘minor injury’, being ‘embarrassed’ and because the ‘patient was not infected’. In total there were 11 reasons given for non-reporting. This data is presented in Table 4.

Insert Table 4

The device involved in the individual sharps injuries

When analysing the individual injuries (n=135), the most common device involved with sharps injuries was glass (34.9% n=44), followed by subcutaneous injection needle (29.4% n=37) and intramuscular injection needle (13.5% n=17). In total, there were 12 different types of sharps devices reported. This data is presented in Table 5.

Insert Table 5

There was no statistically significant association found between the type of device involved in the sharps injury and gender (p=0.486, *FET*), academic year (p=0.172, *FET*), previous experience (p=0.456, *FET*) and being right or left handed (p=0.846, *FET*).

The procedure involved when the individual sharps injuries occurred

When analysing the individual injuries (n=135), the most common procedure being performed when the sharps injuries occurred was ‘preparation of an injection’ (65% n=80), followed by ‘administration of an injection’ with 12.2% (n=15), and ‘when cleaning or clearing’ (8.9% n=11). In total there were 11 different procedures being performed when the SIs occurred. This data is presented in Table 6.

Insert Table 6

There was no statistically significant association between the procedure involved when the individual sharps injury occurred and gender (p=0.842, *FET*), academic year (p=0.129, *FET*), previous experience (p=0.675, *FET*) and being right or left handed (p=0.751, *FET*).

The stage of the injection process when an individual sharps injury occurred

When analysing the individual injuries (n=135), when sharps injuries occurred during the injection process the most common stages were ‘when drawing up the drug’ (27.7% n=26); ‘when assembling the syringe and needle’ (23.4% n=22), and ‘when opening the ampoule’ (18.1% n=17). There was no statistically significant association between the stages of the injection process when the sharps injury occurred and gender (p=0.484, *FET*), academic year (p=0.997, *FET*), previous experience (p=0.911, *FET*) and whether right or left handed (p=0.701, *FET*).

Whether the sharp was used or clean

In total 82.5% (n=94) of sharps injuries occurred with unused (clean) sharps. There was a statistically significant association between whether the sharp was used or clean and

gender ($X^2(2) = 9.592$, p=0.008). There was no statistically significant association between whether the sharp was used or clean and academic year ($X^2(4) = 1.194$, p=0.879), previous experience ($X^2(2) = 0.881$, p=0.644) or being right or left handed ($X^2(4) = 1.314$, p=0.859)

Post Traumatic Stress Disorder incidence

The survey asked four questions which tested for the incidence of Post Traumatic Stress Disorder following a sharps injury. In total, 5.9% (n=6) of respondents who had sustained a sharps injury answered three or more of the four Post Traumatic Stress Disorder questions positively. This suggests that these respondents showed signs of Post Traumatic Stress Disorder. In total 37.3% (n=38) respondents answered 'yes' to at least one Post Traumatic Stress Disorder question. There was no statistically significant association between sustaining Post Traumatic Stress Disorder and gender (p=0.434, *FET*), academic year (p=0.183, *FET*), previous experience (p=0.681, *FET*) and being right or left handed (p=0.598, *FET*).

Discussion

This appears to be the first survey exploring the incidence and type of sharps injuries within a nursing student population within the UK. The study findings identified the incidence rate of sharps injuries to be 14.7% within nursing students in the UK. An incidence rate of between 9.4 - 100% (Blackwell et al., 2007; Trivedi et al., 2013) and a prevalence rate of between 5.9 - 94.2% (Sharma et al., 2010; Cheung et al., 2012) was identified within studies conducted worldwide. This low incidence rate compares to similar figures reported within Italy (Petrucci et al., 2009); Belgium (Vandijck et al.,

2008); Australia (Smith and Leggat, 2005); Canada (McCarthy and Britton, 2000); South Africa (Zungu et al., 2008); India (Kermode et al., 2005) and Turkey (Irmak and Baybuga., 2011).

This study revealed that sharps injuries mostly occurred within the second year of the programme with an incidence rate of 44.5%. This echoes the findings of studies which identified the second year as the academic year with the most occurrences (Petrucci et al., 2009; Mitra et al., 2010). This may link to more sharps usage happening at that stage and possibly more opportunities to give injections than in the previous year (Smith and Leggat, 2005; Ozer and Bektas, 2012).

Various locations of the sharps injury were identified, with the treatment room (44.4% n=52) and the patient's bedside (29.1% n=34) shown to be the prime sites. Similar findings were identified within the literature (Talas, 2009; Karadag, 2010; Lukianskyte et al., 2011). Within this study medical (26.3% n=30) and surgical (18.4% n=21) environments were reported as the most common specialties, and this echoes the findings reported within the systematic review (Yang et al., 2004; Yao et al., 2010; Irmak and Baybuga, 2011; Cheung et al., 2012; Yao et al., 2013).

This study's findings identified the various devices involved in these sharps injuries, with glass (34.9% n=44) being the most common. Glass has been reported within other studies (Karadag, 2010; Ozer and Bektas, 2012).

Most sharps involved in the sharps injuries were clean and unused, but worryingly 17.5% within this study were classed as used. A similar figure was identified by Smith

and Leggat (2005) of 15.8%, but this is approximately half of the 36.3% of used sharps causing injury to nursing students reported by Zhang et al (2017).

This study has also explored the experience of nursing students who had sustained a sharps injury. It was identified that 21.4% (n=25) of nursing students were not being observed by their mentor at the time of the incident. This is approximately half of the rate of 55% (n=27) reported by Small et al (2011) and 50% reported by Petrucci et al (2009).

There were many varied contributing factors identified, with inexperience (n=54) being seen as the most common cause. A small body of knowledge relating to this issue supports this finding (Shiao et al., 2002; Smith and Leggat, 2005; Khoshnood et al., 2015; Suliman et al., 2018).

The study identified that 5.9% of nursing students who has sustained a sharps injury displayed the characteristics of Post Traumatic Stress Disorder, whilst 38 participants within the survey suffered the impact of the sharps injury. There is a dearth of data available within the literature regarding nursing students to compare these findings. The only evidence identified which has used terminology in this domain was conducted by Hussain et al (2012) who investigated sharps injuries involving dental, medical and nursing students and discovered that 15% had suffered mental distress as a consequence. Additionally, Naidoo (2010) documents many psychological effects suffered by nursing students which appear to link to Post Traumatic Stress Disorder, but did not definitively identify the condition within the participants of the study. As there are no direct comparisons with other research studies investigating nursing students and

Post Traumatic Stress Disorder, the only comparisons which can be made relate to trainee doctors. Post Traumatic Stress Disorder was identified in 12% of trainee doctors who had experienced at least one sharps injury during their training within the UK (Naghavi et al., 2013).

Strengths and limitations

The online survey questionnaire was developed with attention to detail, solely for the purpose of this study and went through a rigorous process of validity and reliability testing. This aided the generation of pertinent data for analysis in order to answer the research questions which had been set (Moule and Goodman, 2014).

The use of social media sites to distribute the survey nationally proved to be a cheap and effective method of targeting 274 nursing students within the UK (O'Connor et al., 2014).

Survey results can always be questioned due to the size of the sample and whether 'true responses' were actually obtained. This is due to issues relating to memory; motivation of participants to complete the survey; wanting to look favorably and the participant not wanting to appear incompetent (Moule and Goodman, 2014). The small sample size may have resulted in a Type II error, and not finding an association between sharps injuries and variables such as gender, when one actually exists (Polit and Beck, 2010).

The utilisation of convenience and snowball sampling within a quantitative framework risks potential sampling bias to enter the research process (Taylor, 2014).

Due to the nature and purpose of the study, the researcher devised the data collection instruments, and collected and analysed all of the data. Even though triangulation occurred and others played a role in verifying the instruments, bias could have been introduced within the data collection and analysis stage (Parahoo, 2014).

Conclusion

The study identified that sharps injuries occurred most commonly during the afternoon on a long day shift, and the treatment room and the patient's bedside were key locations. Medical and surgical environments were popular specialities where sharps injuries occurred, with the community being a prominent location because of its unfamiliarity to some nursing students. Contributing factors were numerous with inexperience being seen as a major factor. The hand was vastly the most common part of the body affected by sharps injuries, accounting for just over a half of sharps injuries reported. There was a major psychological factor identified within the study, as although small in number, some nursing students showed signs and symptoms of Post Traumatic Stress Disorder following a sharps injury. A larger research study needs to be carried out with regards to the association between sharps injuries and Post Traumatic Stress Disorder to reach more conclusive conclusions.

Relevance to clinical practice and education

The incidence rate of sharps injuries in a nursing student population in the UK has been identified as being 14.7 percent. Previously this data was known in many countries around the world, but not within the UK itself. Additionally to this it has been identified that the second year of the programme is the most common stage when sharps injuries occur in the UK. It is now known how many nursing students per year sustain a sharps injury. Making mentors of nursing students in practice setting aware of this is imperative, as it can occur in most placement areas within hospitals and within community areas.

Glass has been established as the most common device involved with sharps injuries involving nursing students, often caused by the incorrect technique employed when opening the glass ampoule. As nurses and other healthcare workers are viewed as role models by nursing students, in practice the correct technique should be taught and demonstrated to the nursing student with the employment of protective devices which should be made freely available. This also involves working within the legislation, directives and guidelines produced over many decades.

It has been determined that some sharps injuries occur when the nursing student is not being observed by the mentor. This aspect should be addressed until the nursing student has been deemed to be competent in the sharps procedure and complies with the legislation which determines safe practice. The mentor should be aware though that being observed can also contribute to the incidence of sharps injuries by the anxiety this creates in some individuals.

The study identified that all fields of nursing students reported a sharps injury. Nurses, mentors and healthcare workers in practice should be aware that nursing students studying on Adult, Child, Mental Health and Learning Disability programmes are at risk of sharps injuries by the various sharps related procedures involved within those fields.

Healthcare workers should be aware that some nursing students who sustain sharps injuries involving used sharps could show signs and symptoms of Post Traumatic Stress Disorder or other anxiety related issues. These issues could continue for up to two years. It is imperative that this issue is known so that the required follow-up services and help can be instigated.

Tables

Table 1: The exact geographical location of the sharps injury

Location	**Frequency** **N=117**	**Percentage**
Treatment room	n=52	44.4%
Patient's bedside	n=34	29.1%
Patient's own home	n=10	8.5%
Operating theatre	n=9	7.7%
Clinical skills simulation ward	n=6	5.1%

Office	n=2	1.7%
Sluice	n=1	0.9%
Ward pharmacy room	n=1	0.9%
Drug room	n=1	0.9%
Care home	n=1	0.9%

Note: Denominators vary according to missing data; bold figures show the denominators for each variable

Table 2: The specialty where the sharps injury occurred

Specialty	**Frequency** **N=114**	**Percentage**
Medical	n=30	26.3%
Surgical	n=21	18.4%
District nursing	n=18	15.8%
University Clinical skills Ward	n=6	5.3%
Theatres (including recovery)	n=6	5.3%
GP surgery	n=5	4.4%
Nursing home	n=5	4.4%

Oncology	n=4	3.5%
Intensive care unit	n=4	3.5%
Out patients department (including GU clinic)	n=4	3.5%
Community hospital	n=3	2.6%
Palliative Care Unit and Hospice	n=3	2.6%
Emergency Department	n=2	1.8%
Gynaecology	n=2	1.8%
Endoscopy unit	n=1	0.9%

Table 3: The potential causes of the sharps injury

Cause	**Frequency of reporting**
Inexperience	54
Lack of familiarity	35
Equipment	35
Stress	18
Haste	15
Lack of sleep	11
Lack of protective devices	11
Inattention	11
Carelessness	11
Supervision	5

Heavy workload	5
Carelessness of a colleague	2
Faulty equipment	1
Patient movement	1
Patient's skin integrity	1
Lack of light	1

Table 4: Reasons why the nursing student did not report the sharps injury

Reasons why the nursing student did not report the SI	**Frequency of responses**
Unused or clean	61
Minor injury	44
Embarrassed	25
Patient not infected	11
Did not know how to report	9
Afraid	6
Too shy	5

Worried it would affect assessment	5
Lack of time	3
Mentor / other advised not to report	2
Too complicated	1

Table 5: The device involved in the individual sharps injuries

Device	**Frequency** **N=126**	**Percentage**
Glass	n=44	34.9%
Subcutaneous injection needle	n=37	29.4%
Intramuscular injection needle	n=17	13.5%
Blood glucose lancet	n=7	5.6%
Intravenous injection needle	n=6	4.8%
Scalpel or stitch cutter	n=4	3.2%
Scissors	n=3	2.4%
Filter needle	n=3	2.4%

Tablet cutter	n=2	1.6%
Intradermal injection needle	n=1	0.8%
Cap of urine bottle	n=1	0.8%
Sewing needle	n=1	0.8%

Note: Denominators vary according to missing data; bold figures show the denominators for each variable

Table 6: The procedure involved when the individual sharps injuries occurred

The procedure	**Frequency** **N=123**	**Percentage**
Preparation of an injection	n=80	65%
Administration of an injection	n=15	12.2%
When cleaning or clearing	n=11	8.9%
When assisting a surgical procedure	n=3	2.4%
Accidently injured by a colleague	n=3	2.4%
Taking a blood glucose sample	n=3	2.4%
Removing a suture	n=2	1.6%
Performing an aseptic	n=2	1.6%

technique		
Handling or transferring a sample	n=2	1.6%
Processing or cleaning equipment	n=1	0.8%
Washing a patient	n=1	0.8%
n=123		

Note: Denominators vary according to missing data; bold figures show the denominators for each variable

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