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An audit of sharps injuries in clinical skills simulation wards at a UK university

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ABSTRACT

Aims

The aim of this audit was to identify the incidence of sharps injuries affecting healthcare students within the clinical skills simulation wards of a UK University.

Design

An audit tool was devised and used.

Methods

An audit of sharps injuries sustained in three clinical skills simulation wards was conducted.

Results

Nursing students were involved in 56.5% (n=26) of recorded accidents, of which 69.6% (n=32) of recorded accidents were classed as sharps injuries. Of these, nursing students were involved in 59.375% of them (n=19). Other healthcare students also sustained a sharps injury.

Conclusion

Nursing students are the most common student to sustain any injury in the clinical skills simulation ward, especially sharps injuries.

Background data

Clinical skills training through simulation is playing a progressively more vital role in healthcare education (Offiah et al, 2019). Pre-registration education of multitude types of healthcare students includes periods of simulation as part of the learning process (Williams et al, 2016). Many authors over numerous years have declared the benefits of simulation for healthcare students, commonly taking place in clinical skills simulation wards. Stirling et al (2012) found the benefits to be increased confidence, the development of communication skills, improving teamwork and the reinforcement of basic techniques. Partaking in simulation has been found to improve technical and non-technical skills (Levett-Jones et al, 2015). This is because simulation permits students to develop critical thinking and reasoning skills (Hayes et al, 2015). This is supported by Lowry (2016), who proclaimed that simulation also generates positive learning experiences.

One common skill practiced by healthcare students within the clinical skills simulation ward is handling sharps. This is because healthcare students, including nursing, midwifery, medical, dental and paramedicine students are at high risk of needlestick and sharps injuries throughout their practice in clinical placements (Handiyani et al, 2018; Trevino and Arenas, 2020). Reasons suggested for this high risk include having limited experience and under-developed skills (Shiao et al 2002; Ozer and Bektas 2012). Consequently, there is evidence to suggest that sharps injuries can have a psychological impact of nursing students, such as fear, anxiety and depression (Hambridge et al, 2016).

The location of the clinical skills simulation ward as a place where healthcare students sustain sharps injuries has been identified by very few authors worldwide. Smith and Leggat (2005) identified this location by reporting that 45% of sharps injuries involving nursing students occurred there. It is claimed that nursing students are particularly susceptible to sharps injuries due to their limited clinical experience and insufficient attention to personal safety (Cheung et al, 2012).

The purpose of this audit is to identify if healthcare students sustain sharps injuries in clinical skills simulation wards in the United Kingdom due to a lack of research and reporting of this phenomenon within the literature.

Aims

The aim of this audit was to identify the incidence of sharps injuries affecting healthcare students within the clinical skills simulation wards of a UK University.

Design

An audit of accidents and incidents sustained in three clinical skills simulation wards utilised by a University in the South West of England was conducted. Although data was collected on all accidents and incidents, sharps injuries were the main focus of the audit.

Data collection

An audit tool was devised by the researcher to collect data from accident and incident report forms held at three clinical skills simulation wards utilised by the University (see Table 1). This was due to the fact that there was no identifiable audit tool for this purpose existing in the literature.

Table 1: The audit tool to collect data from accident and incident forms in a Clinical Skills Simulation Ward

Audit tool to collect data from accident and incident forms in a Clinical Skills Simulation Ward	
Year of injury	
Site of Clinical Skills Simulation Ward	
Type of personal involved in accident or injury	
Type of accident or incident	

The audit tool was produced containing carefully considered criteria. These included the year when the injury occurred; the location of the simulation ward involved; the specific person involved with the injury and the type of injury which had been sustained. Collecting this specific data would allow the researcher to determine if sharps injuries had occurred and which healthcare student was involved in the injury.

The audit was conducted in March 2016. The audit consisted of reading each completed accident and incident form at each clinical Skills simulation Ward and extracting the necessary data as per the audit tool. The pertinent information was anonymised and thus no personal data was collected. The extracted data was then inputted into a password protected SPSS v.22 file to allow analysis.

Ethical considerations

Approval for the study was granted by the University Ethics committee.

Data analysis

The audit data was analysed with the aid of SPSS v.22. The analysis entailed identifying the percentages of occurrences of injuries using descriptive statistics. The association between findings and the individual person involved were measured using a chi-square test (X^2) using the significance level of p=0.05 (5%).

The results from the audit

An audit was undertaken of the available accident and incident report forms held within the three clinical skills simulation wards utilised by a university. This detailed accidents and incidents that had occurred between 2008 and March 2016. The results of this audit are presented below.

The audit showed that there were 46 recorded accidents over the eight year period. Nursing students were involved in 56.5% (n=26) of the recorded accidents, followed by medical students (19.6% n=9). In total 10 different personnel recorded an accident during this time. This is presented in Table 2.

Table 2: Personnel who had sustained the recorded accidents within the audit

Personnel who had sustained the recorded accidents	Frequency N=46	Percentage
Nursing student	n=26	56.5%
Medical student	n=9	19.6%
Technician	n=3	6.5%
Dental student	n=2	4.3%
Paramedic student	n=2	4.3%
Cleaner	n=1	2.2%
Work experience	n=1	2.2%

Student midwife	n=1	2.2%
Nurse	n=1	2.2%

Regarding the type of injury, 69.6% (n=32) of recorded accidents were classed as sharps injuries, whilst 19.6% (n=9) were classified as faints. There were six types of accident recorded in total. These are presented in Table 3.

Table 3: The types of recorded accident within the audit

The types of recorded accident	Frequency	Percentage
Sharps injury	n=32	69.6%
Faint	n=9	19.6%
Back injury	n=2	4.3%
Facial injury	n=1	2.2%
Slipped	n=1	2.2%
Splash to eye	n=1	2.2%

Of the 32 recorded sharps injuries, nursing students were involved in 59.375% of them (n=19), whilst medical students were involved in 15.625% (n=5). In total there were eight different personnel who recorded a sharps injury. This data is presented in Table 4.

Table 4: Who had sustained the recorded sharps injuries within the audit

Who had sustained the recorded sharps injuries	Frequency	Percentage
Nursing students	n=19	59.4%
Medical student	n=5	15.6%
Technician	n=2	6.25%
Dental student	n=2	6.25%
Paramedicine student	n=1	3.13%
Cleaner	n=1	3.13%
Work experience	n=1	3.13%
Midwifery Student	n=1	3.13%

There was no statistically significant association between the sharps injury and the type of individual person involved (p=0.761).

Discussion

The audit conducted showed that sharps injuries were the most common injury within the clinical skills simulation ward (69.6% n=32) and that nursing students were the most frequent healthcare students sustaining this (59.4% n=19), or indeed any injury (56.5% n=26). This may have been related to the fact that nursing students are the most frequent users of these facilities. Nursing students locally make up a large percentage of healthcare students accessing the simulation wards to learn and practice clinical skills. The exact details of attendance hours by individual healthcare student fields performing specific skills involving sharps over this time period were not available. Estimations of the number of healthcare students using this facility over this period are approximately 900 paramedicine students and a low thousand number of both nursing and medical students.

There is very limited published data in the literature reporting the clinical skills simulation ward as a location for sharps injuries involving nursing students. The results of this audit do though confirm the findings of Smith and Leggat (2005) that nursing student do sustain sharps injuries within clinical skills simulation wards. There is also a dearth of evidence within the literature regarding how many sharps injuries occur in simulation settings involving other types of healthcare student. Healthcare students do though have sharps injuries in clinical practice which emphasises the importance of simulated practice in order to help to reduce the risk.

Medical students were the second most common personnel to sustain a sharps injury within the clinical skills simulation ward (15.6% n=5). Incidence of sharps injuries involving medical students have been reported to range from 16.6% (Marjadi et al (2017), to 22% (Foytl et al, 2019), to 30% (Patterson et al, 2003), to 39.3% (Ghasemzadeh et al, 2019) and 54% (Naghavi et al, 2013). This links well with the range of 12-41% reported by Deisenhammer et al (2006). More recent data reported within a systematic review stated that one third of medical students sustain blood borne pathogen exposures with needlestick injuries comprising most of these (Trevino and Arenas, 2020). The psychological effects of sharps injuries involving trainee doctors has been reported. These include stress, anxiety and post-traumatic stress disorder (Naghavi et al, 2013).

Zagade et al (2020) identified the incidence rate of sharps injury to be 22.23% amongst dentistry students. Musekene et al (2020) reported 41% of dental students had sustained a sharps injury and similarly Fernandes et al (2017) found an incidence rate of 43%. There is very limited data within the literature regarding sharps injuries involving paramedicine students. Jung (2019) found that an incidence of 28.8%.

Insufficient training has been reported as a probable factor responsible for the high proportion of sharps injuries involving nursing and midwifery students (Smith and Leggat, 2005; Khoshnood et al, 2015). Hence, simulating and practicing with sharps devices within a clinical skills simulation ward is seen as an imperative and essential part of the nursing curriculum. This has been addressed with regards to pre-registration nursing at the University where the audit was conducted. This has

involved demonstrations of safety devices, the promotion of ampoule top removers, annual lectures and an abundance of e-learning relating to sharps usage and management. Further audits will be conducted to review the effect of the enhanced learning on sharps injuries within the clinical skills simulation ward.

The educational institution has been viewed as a major influencer on nursing students clinical practice (Mikkelsen et al, 2008), with 96.3% (n=340) of nursing students within a survey conducted by Hinkin and Cutter (2014) identifying this. Although contrary to this point, a survey (n=1903) of nursing students reported that 59% identified the most important role model to be the mentor in practice, with only 14% identifying the nurse teacher (Saarikoski et al, 2013). This may be a reason why nursing students may then adopt unsafe practices from clinical practice (Hinkin and Cutter, 2014), in this context the use of sharps.

Intravenous needles (Tarantola et al, 2003), needles and glass (Cheung et al, 2010) have been identified as common devices involved with sharps injuries involving nursing students. Regarding other healthcare students, a systematic review conducted by Trevino and Arenas (2020) reported that solid bore needle was the most common device involved with sharps injuries involving medical students. Similarly, Ghasemzadeh et al (2019) identified needles as the most common device involving medical students, followed by a suture needle. Musekene et al (2020) found the needle to be the most device involving dental students. Maurya et al (2017) identified endodontic wire, explorer, scalpel and needle.

It is imperative that lecturers working within simulation settings adhere to the regulations regarding safe sharps usage published since the 1990s. There should be a promotion of the use of safer needle devices (HSE, 1995) as there are many such devices on the market which nursing students can be safely exposed to through simulation. This includes products which safely remove the top from glass ampoules, such as the SnapIT device (P3 Medical Limited, 2012) and the Steritest™ Glass ampoule breaker (Merck, 2016). Additionally to this, it is imperative for students to learn and simulate the safe disposal of sharps (The Personal Protective Equipment at Work Regulations, 1992) in a simulation setting. This includes safe disposal methods post-sharps usage and the safe use of sharps bins. Furthermore, there needs to be a thorough assessment of the various risks to health and safety in relation to the use of sharps (HSE, 1995), and the simulation setting is no different. Education and simulation of best practice relating to safety measures involving sharps is essential because compliance with the necessary regulations remains a significant issue (Jackson et al, 2020). Regarding dentistry, it has been argued that there needs to be more biosafety awareness within educational institutions (Fernandes et al, 2017).

Sharps injuries can also occur when the student is not being observed at the time of the sharps usage (Petrucci et al, 2009; Small et al, 2011). Hence, it is imperative that students who may be anxious and inexperienced should be supervised more effectively within the simulation setting. This may aid the identification of unsafe practices which may contribute to injuries.

Another neglected area within the literature is how vulnerable housekeeping staff and technicians are to sharps injuries (Sharma et al, 2020). This audit showed that 6.25% of sharps injuries involved a technician and 3.13% involved a cleaner. Yunihastuti et al (2020) identified that 5.6% of sharps injuries involved cleaning staff and 1.7% involved a technician. Although small in number, it is imperative that the practice of healthcare students and academic staff within the simulation ward is safe in order to also protect auxiliary staff from harm.

Conclusion

The results from the audit identified that nursing students account for most reported accidents with the University's clinical skills simulation wards, and the most frequent injury there is a sharps injury. This was followed by medical students, but also involved other healthcare students and staff.

Evidence suggests that sharps injuries can have psychological impacts on the student, thus prevention strategies are imperative. These strategies should link to adherence to the multitude of health and safety policies and procedures in relation to the safe use of sharps. This is to protect students and other staff within the simulation settings and to encourage and promote adherence of safe sharps practices for use in clinical practice. There is a dearth of available evidence exploring sharps injuries occurring within the simulation arena. Thus, further investigation into this phenomenon is warranted.

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