

RESEARCH ARTICLE

Risks and Protocols for Occupational Infections in Norwegian Nursing Programs

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ABSTRACT

Hospital-acquired infections (HAI) affect millions of patients and healthcare workers every year. Nursing students are a particularly vulnerable population at increased risk of occupationally-acquired infections and injuries. In this qualitative study, we explore the risks and protocols currently in place for occupational infections in Norwegian nursing programs. Stress and lack of resources were among the identified individual and systemic risk factors, respectively. Accessible reporting systems and surveillance registries were also noted to be lacking across all participating universities. This paper highlights areas of improvement that nursing programs around the world may consider to better protect their students.

INTRODUCTION

Hospital-acquired infections (HAI) are a significant public health threat. In the European Union alone, over four million individuals acquire a HAI every year [1]. According to the World Health Organization, a HAI can be classified as any infection acquired “during the process of care in a hospital or other health care facility which was not present or incubating at the time of admission” [2]. This definition encompasses risks to both patients and healthcare workers (HCWs). Working on the frontlines, HCWs are at an increased risk of needlestick and sharps injuries (NSIs), blood or bodily fluid exposures, and unprotected exposure to contaminated surfaces. Falling under the umbrella of HAI, these workplace health risks can be termed “occupational infections”.

In Norway, there were 2,219 cases of NSIs officially reported from employees in the fields of health and social services between 2015 and 2018 [3]. This number is estimated to be significantly higher due

to under-reporting of occupational infections. In fact, one study found that reporting rates for NSIs could be as low as 10% [4]. Although much of the current literature focuses on protecting hospital staff and patients, a critical population often falls through the cracks: students.

To fill this gap, this qualitative study aims to explore the risks and protocols currently in place for occupational infections in Norwegian nursing programs. The results of this work can help guide future curriculum improvements for nursing programs around the world.

METHODOLOGY

This qualitative, phenomenological study explored the ideas and experiences of 10 program coordinators of various Norwegian nursing programs. The study population was gathered through purposive sampling and included six different campuses distributed among three universities. A semi-structured interview was

conducted with each participant and included questions regarding infection control in the curriculum, major risks to students, and current strategies for infection prevention. For this research study, an occupational infection was defined as any infection obtained by nursing students during their clinical experiences. Interviews were collected through audio recordings and transcribed verbatim. All identifying data were removed prior to transcription to ensure confidentiality. The research team reviewed the transcripts and the first author coded units by hand into analytic categories. By comparing and contrasting categories across the transcripts, higher order themes were developed. Ethics approval was not required in Norway as identifiable data were not collected; however, informed verbal consent was obtained from all participants.

RESULTS

Risks

Both individual and system-level factors may contribute to a student's increased risk of infection. Common themes among individual factors included observed lack of preparation for simulation labs, general "negligence" as stated by the participants, and lack of experience. These were all subjective factors mentioned by staff. One participant importantly noted that mental health concerns, such as depression, stress, and anxiety, could also impact a student's ability to focus, thus putting them at an increased risk of NSIs. System-level risk factors included lack of resources (i.e. inadequate number of needle disposal boxes in simulation labs), lack of education given to students (i.e. outdated curriculum), lack of organization and supervision (i.e. high student-to-faculty ratios), and lack of time (i.e. overloaded student schedules).

Protocols

University protocols on occupational infection exposure differed quite significantly. Some programs offered online checklists for students to follow in the event of an occupational infection or injury, while others required that students and supervisors fill out incident reports. Notably, some campuses lacked an organized system altogether.

Although incident reports were implemented at some campuses, the information from these reports was not used for infectious disease surveillance purposes. None of the universities represented in interviews had a registry in place to track occupational injuries among nursing students. However, all participants noted that this should be implemented in the future. One participant indicated that this lack of registry was "a weakness" of their nursing program.

DISCUSSION

Although mentioned by many participants, the subjective individual factors, such as lack of preparation or general "negligence", are difficult to measure and even more challenging to address at the system level. For these reasons, there is lack of strong supporting evidence in the literature. However, our results underlined an important risk factor that can be both measured and addressed systemically: the impact that mental illness and stress can have on a student's risk level. A positive correlation between stress perception and NSIs has also been found by other researchers [5]. Another study found that decreasing burnout in HCWs by 30% led to over 6000 fewer hospital-acquired urinary tract infections for patient, thus showing a positive impact on patient health as well [6]. Universities are encouraged to screen students using tools such as the Nurses Work Functioning Questionnaire; this valuable tool may help assess the effects of mental disorders on the work and safety of HCWs [7]. The results of these questionnaires can help guide future wellness initiatives and mental health resources for students.

In addition to individual risk factors, system-level factors were said to increase one's risk of infection. Placing needle disposal boxes at the bedside has been shown to decrease the rates of needle recapping and subsequent injury [8]. Other suggested strategies include wearing double gloves [9]. Furthermore, nursing curriculums should be assessed to ensure student schedules are reasonable. A study from the United States found that overburdened nurses (working more than 13 hours per day) had an increased risk of occupational

infection or injury [10]. Overnight shifts were also found to significantly increase the risk of NSIs [11-13].

Although occupational infection rates may initially seem low, it is thought that most HAIs go unreported [4]. Our results suggest that this underreporting may be due to a lack of accessible, easy-to-use reporting tools and registries. A study in Singapore found that students may be more likely to report HAIs if the online system was more user-friendly [14]. The authors also suggested that a 24-hour reporting hotline be implemented [14]. With the claims that are submitted, universities are encouraged to form organized registries to monitor trends over time and prevent future injuries and infections. This was a noted gap among all participating universities. A study in Norway found hospital-based surveillance systems decreased the rate of surgical site infections by 57% [15]. Similarly, researchers in France saw a 58.6% reduction in infections after the implementation of a surveillance system [16]. There is, unfortunately, a lack of data on the student population and university registries. Currently, Norway has a national record-keeping system under the Norwegian Surveillance System for Communicable Diseases; however, this relies on accurate reporting by HCWs and student injuries are often left unreported.

Due to researcher time constraints and student holiday schedules, we were unable to interview the nursing students and gather their lived experiences regarding occupational infection control practices. As such, our study population – comprised only of university faculty – may introduce a sampling bias. Other limitations of this study include language barriers and potential social desirability biases when interviewing faculty leaders on behalf of their university program. In addition to interviews, an anonymous survey and a larger sample size would have been valuable. Future research is needed to minimize these biases and to gain a deeper understanding of the student perspective.

CONCLUSION

Occupational infection control is a critical component of healthcare and must be distinctly

distinctly incorporated into the curriculum of nursing programs. This study explored the risk factors and protocols currently in place in Norwegian nursing programs. Most notably, it highlighted a widespread need for increased mental health resources and accessible reporting systems and registries. When updating the nursing program curriculum, all universities are urged to prioritize occupational infection control and to consider implementing any appropriate changes.

REFERENCES

1. Annual Epidemiological Report on Communicable Diseases in Europe 2010 | National Resource for Infection Control (NRIC) [Internet]. [cited 2020 Feb 1]. Available from: <https://www.nric.org.uk/node/52585>.
2. WHO | The burden of health care-associated infection worldwide [Internet]. WHO. [cited 2020 Feb 1]. Available from: https://www.who.int/gpsc/country_work/burden_hcai/en/.
3. Rapporterte arbeidsulykker, etter næring (SN2007) og type ulykke 2015 - 2018 [Internet]. PX-Web SSB. [cited 2020 Feb 1]. Available from: <http://www.ssb.no/statbankstatbank/table/11343/>.
4. Joukar F, Mansour-Chanaei F, Naghipour M, Asgharnejhad M. Needlestick injuries among healthcare workers: why they do not report their incidence? *Iran J Nurs Midwifery Res*. 2018;23(5):382-7.
5. Wang C, Huang L, Li J, Dai J. Relationship between psychosocial working conditions, stress perception, and needle-stick injury among healthcare workers in Shanghai. *BMC Public Health*. 2019 Jul 4;19(1):874.
6. Cimiotti JP, Aiken LH, Sloane DM, Wu ES. Nurse staffing, burnout, and health care-associated infection. *Am J Infect Control*. 2012 Aug;40(6):486-90.
7. Gärtner FR, Nieuwenhuijsen K, van Dijk FJH, Sluiter JK. Impaired work functioning due to common mental disorders in nurses and allied health professionals: the Nurses Work Functioning Questionnaire. *Int Arch Occup Environ Health*. 2012 Feb;85(2):125-38.
8. Makofsky D, Cone JE. Installing needle disposal boxes closer to the bedside reduces needle-recapping rates in hospital units. *Infect Control Hosp Epidemiol*. 1993 Mar;14(3):140-4.
9. Hasak JM, Novak CB, Patterson JMM, Mackinnon SE. Prevalence of needlestick injuries, attitude changes, and prevention practices over 12 years in an urban academic hospital surgery department. *Annals of Surgery*. 2018 Feb 1;267(2):291-6.
10. Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J. Work schedule, needle use, and needlestick injuries among registered nurses.

Infect Control Hosp Epidemiol. 2007 Feb;28(2):156-64.

11. Zhao I, Bogossian F, Turner C. Shift work and work related injuries among health care workers: A systematic review. Australian Journal of Advanced Nursing 2010 Mar;27(3):62-74.

12. Lotfi, Gashtasbi A. Needle stick and sharps injuries and its risk factors among health center personnel. Journal of Babol University of Medical Sciences. 2008 Oct 10;10(4):71-7.

13. Parks DK, Yetman RJ, McNeese MC, Burau K, Smolensky MH. Day-night pattern in accidental exposures to blood-borne pathogens among medical students and residents. Chronobiol Int. 2000 Jan;17(1):61-70.

14. Seng M, Lim JW, Sng J, Kong WY, Koh D. Incidence of needlestick injuries among medical students after implementation of preventive training. Singapore Med J. 2013 Sep;54(9):496-500.

15. Skråmm I, Šaltytė Benth J, Bukholm G. Decreasing time trend in SSI incidence for orthopaedic procedures: surveillance matters! J Hosp Infect. 2012 Dec 1;82(4):243-7.

16. L'Hériteau F, Olivier M, Maugat S, Joly C, Merrer J, Thaler F, et al. Impact of a five-year surveillance of central venous catheter infections in the REACAT intensive care unit network in France. J Hosp Infect. 2007 Jun 1;66(2):123-9.