Jurnal
Berita Ilmu Keperawatan

Jurnal Berita Ilmu Keperawatan
Vol. 15 (2), 2022
p-ISSN: 1979-2697
e-ISSN: 2721-1797

Differences in Knowledge Level of Academic and Internship Students on the Prevention of Healthcare Associated Infections (HAIs)

Khansa Salsabila Wahyu Widyan Utami[1], Wantiyah[2*], Retno Purwandari[3]

[1,2,3]*Nursing Science, Faculty of Nursing, University of Jember, 68121, East Java, Indonesia.*
* correspondence : wantiyah.psik@unej.ac.id

Abstract: *Among healthcare workers, nurses are the ones most contacted with patients and infectious materials in the nursing room. Nurses lack of knowledge factors can lead to HAIs. Therefore, it's important for nursing students who have not practiced or have practiced in hospitals to understand how to prevent HAIs. The aim of this study was to analyze the difference in knowledge levels of academic nursing students and professional nursing students in prevention. This study used descriptive design with comparative analysis. Total participant is 298 nursing students consisted of 196 academic nursing students and 102 professional nursing students were gathered with total sampling technique and statistic test used Mann Whitney. The results showed there aren't a difference in knowledge level of the academic nursing students and professional nursing students, on the indicator of knowledge about HAIs (p= 0,619), on the indicator of knowledge about standard precautiom (p= 0,459), and there is a difference on the indicator of knowledge about hand hygiene (p= 0.001). Almost all respondents have good knowledge about HAIs. Knowledge of HAIs is very important to learn, with the aim that nursing students can avoid exposure to HAIs, and can apply HAIs prevention and control when practicing in healthcare settings.*

Keywords: *Knowledge, Prevention of Healthcare Associates Infections, Nursing Students, Professional Nursing Students*

INTRODUCTION

Healthcare-Associated Infections (HAIs) are infectious infections that develop in various health services such as long-term care, family medicine clinics, home care, and outpatient care (Haque et al., 2018). The spread of HAIs is not only among patients; health workers and visitors can also be exposed to HAIs when they are in a health facility environment (Ministry of Health, 2017). Factors that can cause HAIs consist of two factors, namely intrinsic factors such as age, respiratory and cardiac conditions, immunocompromised and patient congenital disease, and extrinsic factors such as health workers, hospital environment, hospital equipment, also knowledge, and basic practices of controlling HAIs. (Thomas, 2018). Factors such as nurses' lack of knowledge, bad behavior or attitudes, lack of care facilities, and nurse supervision can also cause nosocomial infections (Marbun, 2018). one of the actions to prevent HAIs is by implementing the standard precautions. CDC and HICPAC (2007) stated in The Regulation of Ministry of Health (Permenkes, 2017) recommend eleven main components to apply standard precautions, such as: hand hygiene, use of personal protective equipment, decontamination of patient care equipment, environmental health, waste treatment, protection of health workers, management of linens. Safe injection practices, patient placement, cough etiquette, and sneeze etiquette.

Nurses are health workers in direct contact with patients, make contact with patients, and deal directly with infectious materials in the treatment room (Puspasari, 2015). Therefore, nurses need good knowledge and skills to prevent HAIs in hospitals (Sumaryati, 2017). It is essential for health workers, including nursing students who are practicing, even in certain treatment rooms where there are many students from various institutions undergoing the practice, to know the actions to prevent HAIs (Aditi et al., 2012). Askarian et al. (2007) mention that several risk factors cause students to be exposed to

HAIs, such as lack of clinical experience in HAIs prevention measures, lack of PPE for student protection, and lack of good practice in performing medical procedures.

Research by Davran and Karaca (2021) shows that nursing students' average level of knowledge is at a moderate level. Most nursing students stated that they had received knowledge about the prevention of HAIs during their formal education. In addition, some of them have also received training on the prevention of HAIs in hospitals. Although students have learned about HAIs prevention in formal education, they need real training on HAIs prevention in hospitals. The training is needed to bridge the gap between knowledge in formal education and reality in hospitals. With good knowledge and training, nursing students are expected to be aware of a significant role in preventing HAIs in hospitals. From the background discussion above, the researcher wants to know the difference in the level of knowledge of the two, both professional students and academic students from the 2017 class, in preventing HAIs.

METHOD

This study uses a descriptive research design with comparative analysis. It uses total sampling as a sampling technique involving 298 respondents consisting of 196 academic students and 102 professional students of the Faculty of Nursing, University of Jember. Data were collected using a student characteristics questionnaire, knowledge about HAIs, which had ten questions (Afifah, 2010), a knowledge questionnaire about the application of standard precautions, which had 18 questions (Al-rawajfah and Tubaishat, 2015 in Ningtyas, 2019), and knowledge about the application of hand hygiene that has 18 questions (Ferdinah, 2017). The statistical test used was Mann-Whitney. This study uses the value of = 0.05. If the p-value < 0.05, then Ha fails to be rejected with the interpretation that there is a difference in the level of knowledge on preventing HAIs between academic students and professional students.

RESULTS

Characteristics of Respondents

The characteristics of the respondents include gender and academic level. The complete data is shown in the following table.

Tabel 1. Characteristics of Respondents (n=298)

Characteristics	Frequency	Percentage (%)
Gender		
Male	53	17.8
Female	245	82.2
Academic Levels		
Academic students	196	65.8
Professional (internship) students	102	34.2

Based on table 1, the data shows that the number of respondents based on gender is primarily female, with as many as 245 students (82.2%). Based on the academic level, most are students from the 2017 class as many as 196 students (65.8%).

Student Knowledge Level about HAIs

The indicator of the level of student knowledge about HAIs consists of 10 questions with poor, moderate, and good levels of knowledge. The research results on student knowledge about HAIs are shown in table 2 below.

Table 2. Distribution of Knowledge Level About HAIs

Student Levels	**Category**	Frequency	Percentage (%)
Academic	poor	0	0
	moderate	7	3.6
	good	189	96.4
Internship	poor	0	0
	moderate	2	2.0
	good	100	98.0

Based on table 2, it can be seen that 196 students of class 2017 (96.4%) have good knowledge about HAIs. Meanwhile, for professional students, it is known that 100 professional students (98%) have good knowledge about HAIs. There are no (0%) students, both at the academic and professional levels, who have poor knowledge.

Student Knowledge Level about Standard Precaution

The indicator of the level of student knowledge about standard precautions consists of 18 questions with poor, good, and excellent knowledge levels, which are shown in the following table:

Table 3. Distribution of Students' Knowledge Levels About Standard Precautions

Students' Level	**Category**	**Frequency**	**Percentage (%)**
Academic	Poor	4	2.0
	Good	30	15.3
	Excellent	162	82.7
Internship	Poor	7	6,9
	Good	0	0
	Excellent	95	93.1

Based on table 3, it can be seen that 162 students in of class 2017 (82.7%) have very good knowledge about standard precautions. Meanwhile, for professional students, it is known that 95 professional students (93.1%) have very good knowledge about standard precautions.

Student Knowledge Level about Hand Hygiene

The indicator of student knowledge about hand hygiene (HH) consists of 18 questions divided into two categories, namely good and poor. The results of the study are shown in table 4 below.

Table 4. Distribution of Students' Knowledge Levels About Hand Hygiene

Student Levels	**Category**	**Frequency**	**Percentage (%)**
Academic	Poor	136	69.4
	Good	60	30.6
Internship	Poor	48	47.1
	Good	54	52.9

Based on table 4, it can be seen that 60 students of the 2017 class (30.6%) have good knowledge about the application of hand hygiene. Meanwhile, for professional students, it is known that 54 professional students (52.9%) have good knowledge about the application of hand hygiene.

Differences in Knowledge Level of Academic Students and Professional Students on Prevention of Healthcare-Associated Infections (HAIs)

The non-parametric test used is the Mann-Whitney test. This test was used because the data distribution was not normal. The results of the Mann Whitney test analysis can be seen in the following table.

Table 5. Results of The Analysis of Differences In The Level of Academic and Professional Students in The Prevention of Healthcare-Associated Infections (HAIs)

Variable	Indicator	Student Levels	n	p-value
Knowledge Level on Prevention of Healthcare-Associated Infections (HAIs)	Knowledge Level on HAIs	Academic	196	0.619
		Internship	102	
	Knowledge Level of Standard Precaution	Academic	196	0.459
		Internship	102	
	Knowledge Level of Hand Hygiene	Academic	196	0.005
		Internship	102	

Based on table 5, the test results using Mann-Whitney obtained p-value = 0.619 on the indicator of knowledge about HAIs, p-value = 0.459 on the indicator of knowledge of SP where this value shows greater than the value of p at the critical limit, namely p = 0.05 which can be it was concluded that there was no difference in the level of knowledge about HAIs and standard precautions between academic students and professional (internship) students. While the value of p = 0.005 on the indicator of knowledge about hand hygiene where the value shows it is smaller than the value of p at the critical limit, namely p = 0.05, it can be concluded that there is a difference in the level of knowledge about hand hygiene of academic students and professional students.

DISCUSSION

Characteristics of Respondents

The total respondents in this study were 298 students. The results of the characteristics of the respondents obtained in this study are gender and academic level. Based on the characteristics of the students and the number of respondents seen from the gender, the most are women, as many as 245 students. Women dominate nursing students compared to men because women's attitudes are friendly, patient, painstaking, and easier to socialize with, causing the nursing profession to be more favored by women (Sari, 2015). Based on the academic level of the 2017 class of students, as many as 196 students and professional students as many as 102 students.

Student Knowledge Level about HAIs

The results showed that the 2017 class of students who had moderate knowledge of HAIs was 3.6%, while the 2017 class of students with good knowledge was 96.4%. This research is in line with

Prathibha & Umarani's research (2014), which shows that students who have good knowledge (88%) and only 12% of students have sufficient knowledge about HAIs.

The results showed that 2% of professional students had moderate knowledge of HAIs, and 98% had good knowledge of HAIs. This research is in line with Ridho's research (2020) with 63 professional nursing students at the University of 'Aisyiyah Yogyakarta, with the results that 81% of nursing students have good knowledge, 14.3% of nursing students have sufficient knowledge, and 4.7% of nursing students have less good knowledge about HAIs. Knowledge can be obtained anywhere, including mass media, electronic media, health workers, and others (Notoatmodjo, 2012). Students who have good knowledge can prevent the occurrence of HAIs, such as knowing how to take nursing actions according to procedures. Therefore, nursing students must know HAIs prevention actions well (Ridho, 2020).

Student Knowledge Level about Standard Precaution

The results showed that 2% of the 2017 students had poor knowledge of the application of precautionary standards, 15% of the 2017 students had good knowledge of the application of precautionary standards and 83% of the 2017 students had excellent knowledge of the application of precautionary standards. This study is in line with the research of Brosio et al. (2017), which states that of all generations of nursing students, the level of knowledge about standard precautions has very good knowledge.

7% of professional students have good knowledge about applying standard precautions and 93% of professional students have very good knowledge of the application of standard precautions. This research is related to Suarnianti's research (2017), which states that 94.1% of STIKes Nani Hasanuddin Makassar Nurse students have a high level of knowledge and 5.9% have a low level of knowledge about Precaution Standards. The level of student knowledge is influenced by several factors, one of which is the information factor. In the research of Xiong et al. (2016), it was stated that students who had been given intervention in the form of information about standard precautions showed an increase in their level of knowledge. Another factor that affects the knowledge of professional students regarding precautionary standards is the training from related agencies called the Registrar's Office and training in hospitals called orientation. This activity is carried out before professional students enter the hospital practice (Ningtyas, 2019).

Student Knowledge Level about Hand Hygiene

The results showed that 69% of the 2017 class of students had less knowledge about hand hygiene, and 31% of the 2017 class of students had good knowledge of the application of hand hygiene. This study is related to Nair et al. (2014) research, which stated that 95.4% of nursing students had good knowledge of hand hygiene, as evidenced by 45 of 46 respondents who said they knew the correct hand washing technique.

Meanwhile, for professional respondents, it is known that 47% of professional students have a low level of knowledge about the application of hand hygiene and 53% of professional students have a good level of knowledge about the application of hand hygiene. This study is related to Imallah's research (2019) which revealed that 15% of nursing students at the University of 'Aisyiyah Yogyakarta had good knowledge, 28% had sufficient knowledge, and 6% had poor knowledge of hand hygiene. Knowledge of professional students in the less category is due to the lack of experience factors and the application of hand hygiene (Ott & Irani, 2015).

Differences in students' knowledge level about HAIs' prevention

The study results on the knowledge indicator showed that there was no difference in the level of knowledge about HAIs between academic and professional level students (p: 0.619, : 0.05). Similarly, the standard precaution indicator also shows no difference in the level of knowledge about standard precautions between academic students and university students (p = 0.459, : 0.05).

Knowledge can be obtained from several things, such as education level, age, exposure to information, experience, social relations, and social status (Chaidir et al., 2016). Therefore, there is no difference in the level of knowledge of academic and professional students on HAIs knowledge, and standard precautions are influenced by exposure to information obtained when taking academic education. Academic students and professional students only get material on HAIs and standard precautions during K5 courses. However, the provision of material on HAIs and standard precautions to academic and professional students is still minimal. It is not explained in more depth related to the concept of HAIs and standard precautions outside of K5 courses.

In the indicator of knowledge about HH, p-value = 0.005 (<α: 0.05), so it can be concluded that there is a difference in the level of knowledge about HH among academic students and professional students of the Faculty of Nursing, University of Jember. Factors that may cause the level of knowledge of professional students to be higher than 2017 class students are education factors and experience in taking HH actions. The level of education will affect a person's perception of his cognitive abilities (Suwaryo & Yuwono, 2017). The higher the education, the wider the level of knowledge (Budiman & Riyanto, 2013). The experience factor also influences differences in academic and professional students' levels of knowledge. The experience of applying hand hygiene in services to professional students is more than the experience of applying hand hygiene in services to class 2017 students. This result suggests that the longer the experience, the better the individual gains knowledge (Ar-Rasily & Dewi, 2015).

CONCLUSION

This study concludes that there is no difference in knowledge about HAIs and precaution standards in academic and professional students. However, there is a difference in hand hygiene knowledge among academic and professional students. The researchers suggest that these results can be used as input and evaluation materials to increase student knowledge, especially the application of standard precautions and hand hygiene. Besides that, further intervention research can increase students' knowledge about HAIs.

REFERENCES

Aditi, S.G., H. R. Agustina, & A. A. Amrullah. (2012). *Knowledge and Attitudes of Medical Students in the Prevention of Nosocomial Infections* (Pengetahuan dan Sikap Mahasiswa Akper Terhadap Pencegahan Infeksi Nosokomial). x(x): 1-15. https://jurnal.unpad.ac.id/ejournal/article/view/685/731

Ar-Rasily, O. K., & P.K. Dewi. (2016). *Factors Affecting Parents' Knowledge Level About Genetic Disorders Cause Intellectual Disabilities in Semarang City* (Faktor-Faktor yang Mempengaruhi Tingkat Pengetahuan Orang Tua Mengenai Kelainan Genetik Penyebab Disabilitas Intelektual di Kota Semarang). *Jurnal Kedokteran Diponegoro*. 5(4):1422-1433. https://ejournal3.undip.ac.id/index.php/medico/article/view/15599/15092

Askarian, M., B. Honarvar., H. Tabatabaee, & O. Assadian. (2004). Knowledge, Practice and Attitude towards Standart Precautions in Iranian Medical Students. *Journal Hospital Infections*. 58(4):292-296. DOI: 10.1016/j.jhin.2004.07.004

Brosio, F., P .Kuhdari, A. Stefanati, N. Sulcaj, S. Lupi, E. Guidi, M. Bergamini, & G. Gabutti. (2017). Knowledge and Behaviour of Nursing Students on the Prevention of Healthcare Associated Infections. *Journal of Prevention Medicine and Hygiene.* 58(2): 99-104. https://pubmed.ncbi.nlm.nih.gov/28900349/

Budiman & A.Riyanto. (2013). *Capita Selecta Knowledge and Attitude Questionnaire in Health Research* (Kapita Selekta Kuesioner Pengetauan dan Sikap dalam Penelitian Kesehatan). Jakarta: Salemba Medika

Chaidir, Q. F.L. Rahmi, & T. Nugroho. (2016). *The Relationship of Knowledge Level of Glaucoma Patients with Adherence to Using Drugs* (Hubungan Tingkat Pengetahuan Penderita Glaukoma dengan Ketaatan Menggunakan Obat). *Diponegoro Medical Journal.* 5(4): 1517-1525. https://ejournal3.undip.ac.id/index.php/medico/article/view/15780/15261

Imallah, R. N. (2019). *Relationship of Knowledge with Perception of Hand Hygiene Compliance Students of the Nursing Study Program, Aisyiyah University Yogyakarta* (Hubungan Pengetahuan dengan Persepsi Kepatuhan *Hand Hygiene* Mahasiswa Program Studi Ners Universitas 'Aisyiyah Yogyakarta). *Media Ilmu Kesehatan*. 8(1): 39-45. https://doi.org/10.30989/mik.v8i1.256

Davran, E., & K. Anita. (2021). Knowledge Level of Nursing Students on Nosocomial Infection. *Erciyes Medical Journal.* 43(2):135-141. DOI:10.14744/etd.2019.19615

Haque, M., M. Sartelli, J.M. Kimm, & M.A. Bakar. (2018). Health Care-Associated Infections- an Overview. *Infection and Drug Resistence*. 11(x):2231-2333. doi: 10.2147/IDR.S177247

Kemenkes RI. (2018). *National Standard Survey Instrument for Hospital Accreditation, Edition 1 of 2018* (Instrumen Survei Standar Nasional Akreditasi Rumah Sakit Edisi 1 Tahun 2018. (http://snars.web.id/2018/download/instrumen-survei-snars-2018/). [Diakses pada 6 Juni 2020]

Marbun, A. S. (2018). *Factors Affecting Prevention of Nosocomial Infections In ICU And Inpatient Room 3rd Floor Sari Mutiara Hospital Medan* (Faktor- Faktor Yang Mempengaruhi Pencegahan Infeksi Nosokomial Di Ruang ICU dan Rawat Inap Lantai 3 Rsu Sari Mutiara Medan). *Jurnal Online Keperawatan Indonesia*. 1(2): 10-16. http://e-journal.sari-mutiara.ac.id/index.php/Keperawatan/article/view/422

Nair, S.S., R. Hanumantappa, S.G. Hiremath, M.A. Siraj, dan P. Raghunath. (2014). Knowledge, Attitude, and Practice of Hand Hygiene among Medical and Nursing Students at a Tertiary Health Care Centre in Raichur, India. *ISRN Preventive Medicine.* x(x): 1-4. https://doi.org/10.1155/2014/608927

Ningtyas, W. (2019). *Description of the Knowledge Level and Compliance of Nurse Profession Students to the Application of Standard Precautions as an Effort to Prevent HAIs* (Gambaran Tingkat Pengetahuan dan Kepatuhan Mahasiswa Profesi Ners Terhadap Penerapan Standart Precautions sebagai Upaya Pencegahan HAIs). *Skripsi*. Jember: Universitas Jember

Notoatmodjo, S. (2012). *Health Promotion and Health Behavior* (Promosi Kesehatan dan Perilaku Kesehatan). Jakarta: Rineka Cipta

Ott, L.K. &V.R. Irani. (2015). Evaluating the Effectiveness of Real-Time Feedback on the Bedside Hand Hygiene Behaviors of Nursing Students. *Journal of Nursing Education.* 54(5): 286-289. DOI: 10.3928/01484834-20150417-07

Republik Indonesia, Peraturan Menteri Kesehatan. (2017). *Guidelines for Infection Prevention and Control in Health Care Facilities* (Pedoman Pencegahan dan Pengendalian Infeksi di Fasilitas Pelayanan Kesehatan). Jakarta: Kemenkes

Prathibha, D.S.V& J. Umarani. (2014). Awareness of Students on Prevention of Nosocomial Infection in Pediatric Wards. 4(2): 66-71

Puspasari, Y. (2015). *Relationship of Knowledge, Attitude and Practice of Nurses in the Prevention of Nosocomial Infections in the Inpatient Room of Kendal Islamic Hospital* (Hubungan Pengetahuan, Sikap Dengan Praktik Perawat Dalam Pencegahan Infeksi Nosokomial di Ruang Rawat Inap

Rumah Sakit Islam Kendal). *Jurnal Keperawatan*. 8 (1): 23-43. https://jurnal.unimus.ac.id/index.php/FIKkeS/article/download/1899/1941

Ridho, A. (2020). *Relationship of Knowledge, Attitude and Practice of Nurses in the Prevention of Nosocomial Infections in the Inpatient Room of Kendal Islamic Hospital* (Hubungan Pengetahuan Tentang HAIs dengan Pencegahan Kejadian Needle Stick Injury pada Mahasiswa Profesi NERS UNISA). *Skripsi.* Universitas 'Aisyiyah Yogyakarta

Sari, D. A. D. C. Y. (2015). *The Relationship between Student Perceptions of the Nursing Profession and Motivation to Continuing Nursing Professional Education at PSIK, University of Jember* (Hubungan Persepsi Mahasiswa tentang Profesi Keperawatan dengan Motivasi Melanjutkan Pendidikan Profesi *Ners* di PSIK Universitas Jember). *Skripsi*. Jember: PSIK UNEJ

Suarnianti. (2017). *The Influence of Knowledge and Attitudes on the Application of Standard Precautions for Nursing Students of STIKES Nani Hasanuddin Makassar* (Pengaruh Pengetahuan dan Sikap Terhadap Penerapan *Standard Precautions* Mahasiswa Ners STIKES Nani Hasanuddin Makassar). *Global Health Science*. 2(2): 126-131. http://dx.doi.org/10.33846/ghs.v2i2.84

Sumaryati, M. (2017). *The Influence of Nurses' Knowledge Levels with Nosocomial Infection Prevention Behavior in the Treatment Room of Tajuddin Chalik Hospital Makassar* (Pengaruh Tingkat Pengetahuan Perawat dengan Perilaku Pencegahan Infeksi Nosokomial pada Ruang Perawatan RS Tajuddin Chalik Makassar). *Jurnal Ilmiah Kesehatan Sandi Husada*. 6(2):1129-1142. https://doi.org/10.35816/jiskh.v6i2.202

Suwaryo, P.A.W & P.Yuwono. (2017). *Factors Affecting the Level of Community Knowledge in Mitigation of Landslide Natural Disasters* (Faktor-Faktor yang Mempengaruhi Tingkat Pengetahuan Masyarakat dalam Mitigasi Bencana Alam Tanah Longsor). *The 6th University Research Colloquium.* x(x): 305-314

Thomas, C. (2018). Instrinsic and extrinsic sources and prevention of infection (in surgery). *Surgery*. 37(1): 26-32

Xiong, P., J. Zhang, X. Wang, T.L. Wu, & B.J. Hall. (2016). Effects of A Mixed Media Education Intervention Program on Increasing Knowledge, Attitude, and Compliance with Standard Precautions Among Nursing Students: A Randomized Controlled Trial. *American Journal of Infection Control.* 45(4):389-395