

Undergraduate Nursing Students' Evaluations of Learning Medication Management in Clinical Practice

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Summary. The aim of this study was to describe nursing students' evaluations of learning medication management in clinical practice.

Method. For data collection, a quantitative questionnaire survey was used with a convenience sample of 110 third-year nursing students in three Baltic countries.

Results. According to three-fourths of students' evaluations, many tasks in medication care were performed without adequate supervision. A third of students felt that the medication competence expected from them during clinical practice was higher than their current skill. Approximately half of the students received feedback on their medication competence development from nurse mentors. More than a third of the students reported that they had sufficient opportunities to practise medication management in clinical practice. One-fourth of the students found that the medication education at school and the medication care in practice corresponded well.

Conclusion. More attention should be paid to teaching and practicing medication management in clinical practice. It is essential to enhance the relationship between the student and the nurse mentor, providing students with more opportunities for medication administration under the mentor's supervision, as well as to ensure sufficient feedback and support.

Introduction

Nursing students experience considerable difficulties while learning medication management in clinical practice (1, 2); they find medication administration to be unsafe for patients (3) and clinical practice as anxiety inducing (4, 5). At the same time, clinical practice is essential in nursing education as the development of medication competence requires individually supervised clinical experience with real medication in real-life situations (6). A limited number of studies have been conducted on students' evaluations of their learning of medication management in clinical practice. At the same time, in order to enhance the learning of pharmacology and medication management, it is essential to have feedback from students regarding learning medication management in clinical practice.

According to the position statement of the International Council of Nurses (7), safe use of medicines is an essential part in the provision of quality health and nursing care. Medication errors are not infrequent in health care and a great number of medication errors are made by nurses (8) or nursing students (9). There are many causes of medication errors, one of which is a low medication competence among nurses (10–12), but also inadequate

knowledge and skills of pharmacology and medication management among undergraduate nursing students (5, 13, 14). Enhancement of theoretical education and practical training in the fields of pharmacology and medication management has been recommended in previous studies (5, 13–16). Betts (5) emphasizes the need for more didactic content and increased teaching time in pharmacology and medication management, but also more opportunities for students to practice medication administration. It is important for students to be able to apply their knowledge and skills of pharmacology and medication management in clinical practice in order to increase their proficiency. The amount of training in medication management, specifically the number of hours spent on theoretical studies of medication education and on medication management training in clinical practice in undergraduate nursing education, is not delineated in the European Directive 2013/55/EU (17). Medication education could be harmonized and its quality increased by national recommendations on the amount and core content of medication education as suggested by Sulosaari (14). In addition, Preston et al. (16) state that while making changes in the organisation of education, student evaluations should be considered.

In this article, the term “medication management” is used to denote registered nurses' and nurse students' activities in the overall medication admin-

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istration process. Medication management consists of nurses' professional activities in administering medications, including a variety of tasks in all the phases of the medication administration process (14). The term "nurse mentor" denotes a staff nurse in a clinical institution who has been assigned to supervise a student in clinical practice; "the nurse teacher" is a nursing lecturer who is facilitating clinical training from the higher education institution.

It is the responsibility of higher education institutions to provide nursing students with high quality supervision of practical training that meets the standards (5, 6, 18, 19). This cannot be performed without the clinical practice institution and nurse mentors, as the nurse mentor has an essential role in teaching medication management (20). The results of semi-structured interviews conducted with nursing students ($n = 28$) (6) as well as with nurse mentors ($n = 12$) (21) demonstrated that the quality of student learning experiences in medication administration depends on the nurse mentor, who should, in addition to increasing the student medication competence, also provide support in developing the confidence to administer medication safely. Results of quantitative ($n = 463$) (22) as well as qualitative research demonstrate (23, 24) that nursing students appreciate an individual and supportive relationship with the nurse mentor – the higher the quality of relationship, the better the student performance. To consolidate medication management skills, students should be given opportunities to demonstrate their skills to the mentor in a secure environment (24). At the same time, students should continuously be given constructive feedback on their performance in order to provide a feeling of security (25) and reduce fear (1). The relationship between the student and the nurse mentor should facilitate students to individually discuss with the mentor any errors (24). Students also highlighted the importance of the supervisor's motivation and their engagement regarding the mentorship (23).

In addition to the quality of relationship, nursing students appreciate the supervision tailored according to their individual needs and corresponding to their educational level (22). The results of focus group interviews conducted with nursing students ($n = 7$) showed that nurse mentors are infrequently informed about their students' educational levels (23). This may result in a situation where the mentor's expectations regarding student competence exceed the actual competence level of the student. Betts (5) conducted a qualitative study ($n = 10$) concluding that deficiencies of student knowledge in pharmacology and medication administration are mainly attributable to the lack of pharmacology content in didactic courses. At the same time, in clinical practice, anxiety and stress are induced in

students by medication administration, which complicates the implementation of acquired knowledge. In the study, students voiced concerns regarding how stressful it was to take care of complex patients and the large numbers of medications each patient was prescribed each day. In qualitative studies conducted by Lin et al. (24) and Preston et al. (16), nursing students ($n = 34$ and $n = 99$, respectively) also described difficulties with applying content learned in pharmacology to their experience in the clinical setting. Preston et al. (16) found that students were not always able to select relevant information from what they acquired in a number of theory classes, and properly apply that information in practice. In addition, as suggested by Lin et al. (24), there is much new information available in practice that is specific to the ward that students may not be aware of. According to student evaluations, nurse mentors should keep in mind that although medication management is one part of staff nurses' everyday practice, students experience it as a process involving a number of different and complex stages.

Regardless of the educational level, students should never perform medication administration tasks in clinical practice without supervision as it may cause harm to the patient (4). It also decreases the quality of student learning experiences (6). The results of a qualitative study demonstrated that students were often left alone during medication administration (6). In the quantitative survey ($n = 45$), 88% of respondents had been directly supervised during the entirety of administration procedures, while 66% indicated they received lower levels of supervision when wards were busy. According to student evaluations, 40% of respondents experienced pressure to perform medication administration tasks without adequate supervision (18).

Nursing students experience difficulties with integrating theory and practice of pharmacology and medication management in their clinical training (4, 16, 18). Theory and practice form two major building blocks of nursing education – a dialogue and symbiosis of the two components is a prerequisite of high quality nursing education. Semi-structured interviews conducted with nursing students ($n = 28$) revealed an internal conflict experienced by students in their practical training caused by opposing requirements and expectations set by the higher education institution and the practice institution. Students highlighted in the interviews a difference between what they were taught at the university and what really happened in the clinical setting. The differences were most prominent in medication administration – performing the "rights" when administering medications and conducting the appropriate checks (4). Reid-Searl et al. (18) found in their quantitative survey that 29% of nursing students

(n = 45) disagreed with the statement that the nurse mentor followed the “rights” when administering medications. Donough and van der Heever (19) investigated the competencies of nurse mentors, emphasizing that students experience incompetent supervision not meeting their expectations. For this reason, supervision related support and training should periodically be provided to nurse mentors.

The opposing requirements and expectations set by the higher education institution and the practice institution induce considerable anxiety levels in students (4, 5); students are concerned that they may harm the patient or lose a possibility to get a job (4). It is essential that students are continuously supported by the higher education institution during their clinical training. An ability to provide students with support and constructive feedback throughout the education period is one of the general competencies included in the Nurse Educator Core Competencies established by the World Health Organization (26). Therefore, the aim of the present study was to describe third year undergraduate nursing students' evaluations of their learning of medication management in clinical practice.

Methods

This quantitative questionnaire survey formed one part of the strategic partnership project “The eMedication Passport – cultural adaptation of learning tool for ensuring the development of medication competence of graduate nurses” (eMed-PASS Erasmus+ programme) conducted according to the Erasmus+ programme. The sample of the study involved third-year undergraduate nursing students from three higher education institutions in Baltic countries (Estonia, Latvia and Lithuania). At the time of invitation to participate in the survey, 239 third-year undergraduate nursing students were enrolled at the higher education institutions. They all had completed basic pharmacology and medication administration education, and second year clinical practical training in hospitals (a third of the total amount). Undergraduate nursing education in all three higher education institutions is in accordance with the European Directive 2013/55/EU, requiring full-time training of at least three years as a nurse responsible for general care, with at least half of the duration representing clinical training. Convenience sampling was used in this study.

Data were collected using the Clinical Learning Environments in Learning Medication Management (CLELMM) Scale, which is one of the three subscales comprising the Medication Competence and Associated Factors (MCAF) questionnaire that has been validated in Finland. The MCAF questionnaire has formerly been implemented to evaluate the medication competence and the factors associ-

ated with medication competence among nursing students in Finland (14). The original questionnaire was developed by Sulosaari et al. (20) based on a literature review, an expert panel and a pilot study. In 2018, the author of the questionnaire developed the Baltic version of the questionnaire; followed by translation of the questionnaire into the Estonian, Latvian and Lithuanian languages by a translation agency using the back and forth translation method. The questionnaire was adapted to the cultural context by the clinical nursing teachers as experts in the field and nurse mentors (expert panel) involved in the eMed-PASS project. In this study, the student evaluation of learning medication management in clinical practice was explored with the help of one subsection of the questionnaire – CLELMM Scale, including a 5-point Likert scale with “1” meaning strong disagreement with a statement and “5” meaning strong agreement. In total, 13 statements were evaluated by the students.

In the Baltic countries, this survey questionnaire was implemented for the first time. A one-dimensional approach to the questionnaire was applied in data analysis due to the intention to describe the distribution of ratings based on single statements in order to highlight the details of learning medication management in the clinical setting. In this study, information regarding each statement is serving as a basis for drawing conclusions for clinical training from the nursing students' perspective and providing implications for practice.

The internal consistency of the CLELMM was assessed using Cronbach's coefficient alpha and showed good reliability of the Estonian, Latvian and Lithuanian questionnaires, with the values 0.83, 0.82 and 0.89, respectively. Data were collected with an anonymous on-line questionnaire on the Webropol 3.0 platform during the period of September to November in 2019. Students were invited to participate in the study through the Study Information System or orally in contact-based lectures.

Data collected by the Webropol 3.0 tool were saved on the Microsoft Excel programme and analysed using the statistical software RStudio. Descriptive statistical methods were implemented in data analysis. Frequency distribution and percentage distribution as well as the median values of ratings are provided for each statement. The one-dimensional approach to the questionnaire was implemented in data analysis and description of the results of the study.

Data analysis methods that would have determined associations between the nursing students' background data and their ratings of learning medication management in clinical practice were not applied in the study. The study was intended to collect information about evaluations only, as each evalua-

tion is meaningful for drawing conclusions for learning in clinical practice from the nursing students' perspectives and providing implications for practice to promote learning medication management. Student background is not relevant in this case.

Permission for the recruitment of subjects was obtained from the administrations of the three higher education institutions participating in the project (Grant Agreement 2017-KA203-01). The students were informed about the aim, methodology, voluntary participation and anonymity of the study. Participation in the study had no impact on students' grades. Response to the questionnaire was considered as consent to participate in the study. No personal data were included in the study. The statistical database was electronic. Data were processed and analysed anonymously in a generalized way; aggregate results of the study are presented.

Permission for the use of "Clinical Learning Environments in Learning Medication Management", which is a subscale of the questionnaire "Medication Competence and Associated Factors", was obtained from the authors of the questionnaire prior to the commencement of the study.

Results

The questionnaire was completed by 110 students (response rate was 46%) with the majority of female students (92%). The age of the participants ranged from 20 to 53 years, with the mean age of 24 years (SD = 6.65). The majority of nursing students (74.5%) agreed (agree / strongly agree) that they had been introduced to the responsibilities and tasks of medication management at the beginning of the clinical practice period (Table 1). Most of the students (73.6%) agreed with the statement that they had been able to apply their knowledge of medication care during clinical practice; at the same time, about a third (35.4%) agreed they had had enough possibilities to practise medication management in clinical practice. Less than a third (30.3%) agreed with the statement that they had been expected to have a better medication competence than they actually had; the majority (74.5%) reported the performance of too many tasks in medication care without adequate supervision. More than half (52.7%) agreed that nurse mentors had a positive attitude towards student supervision in medication care, and 47.2% of the students agreed they had received feedback from nurse mentors on their medication competence development. The students were mostly satisfied (74.6%) with the supervision they received when performing tasks for medication care. The majority (81%) agreed that nurse mentors had an important role in student learning of medication care, and 74.5% of the students reported a good supervisory relationship with a mentor, who en-

hanced learning of medication care in clinical practice. More than two-thirds (67.3%) agreed that the nurse teachers supervising their clinical practice had supported them in setting personal learning goals, and 62.7% reported support in integrating theory with practice in medication care. About a fourth of students (26.4%) agreed that medication education acquired at school and medication care in clinical practice corresponded well.

Discussion

This study focused on third-year undergraduate nursing students' evaluation of learning medication management in clinical practice in three higher education institutions in three Baltic countries. Although the results of the study were, to some extent, contradictory, the majority of the students were satisfied with the application of their medication care knowledge and the supervision they received when performing tasks for medication care. The majority of the students appreciated the role of nurse mentors in learning medication care, and good supervisory relationships with mentors enhanced learning of medication care.

Previous studies have also shown that according to student evaluations the quality of learning experience regarding medication management depends on nurse mentors (6). Nursing students appreciate individual supervision in clinical practice and supportive relationships with nurse mentors (22–24). If students consider the nurse mentors' roles very important in their learning of medication care skills, it is essential to create good conditions for the development of a positive relationship between the nurse mentor and the student.

Practising should be safe for the student and the patient. Betts (5) has emphasized that students should be given more opportunities for medication administration in clinical practice. According to Lin et al. (24), the student should have an opportunity to safely demonstrate medication management to the nurse mentor in order to consolidate skills. In our study, more than half of the students rated nurse mentors' attitudes as positive towards supervision of students in medication care; but only 35.4% had sufficient opportunities to practise medication management in clinical practice. One of the reasons why students do not have sufficient opportunities to practise medication management might be a lack of awareness and understanding among nurse mentors that from the students' perspective of medication management is a process involving a number of complex stages that need continuous practise. Students have to apply the information acquired at school, but also the new information obtained in clinical practice. In addition, medication management is increasing students' anxiety levels

Table 1. Frequency distribution, percentage distribution and median values of ratings provided to statements characterizing learning of medication management in clinical practice

Statement	N	n(%)					Median
		1	2	3	4	5	
1. I have been introduced to the responsibilities and tasks on medication management at the beginning of the clinical practice.	110	4(3.6)	9(8.2)	15(13.6)	49(44.5)	33(30.0)	4
2. I have had enough possibilities to practise medication management in clinical practice.	110	5(4.5)	31(28.2)	35(31.8)	23(20.9)	16(14.5)	3
3. I have been able to apply my knowledge on medication care during clinical practice.	110	2(1.8)	7(6.4)	20(18.2)	48(43.6)	33(30.0)	4
4. I have been expected to have better medication competence than I actually have.	109	5(4.5)	41(37.3)	31(28.2)	27(24.5)	6(5.5)	4
5. I have performed too many tasks in medication care without adequate supervision.	110	4(3.6)	7(6.4)	17(15.5)	48(43.6)	34(30.9)	4
6. I am satisfied with the supervision I have received when delivering tasks on medication care.	109	4(3.6)	10(9.1)	14(12.7)	54(49.1)	28(25.5)	4
7. Nurse mentors have had an important role in how I have learned medication care.	110	3(2.7)	2(1.8)	16(14.5)	50(45.5)	39(35.5)	4
8. A good supervision relationship with the mentor has enhanced my learning of medication care during the clinical practice.	109	1(0.9)	4(3.6)	23(20.9)	46(41.8)	36(32.7)	4
9. Nurse mentors have had a positive attitude towards my supervision in medication care.	109	5(4.5)	12(10.9)	35(31.8)	36(32.7)	22(20.0)	4
10. I have received feedback from nurse mentors on my medication competence development.	108	6(5.5)	16(14.5)	36(32.7)	36(32.7)	16(14.5)	3
11. The nurse teachers supervising the clinical practice have supported me in setting personal learning goals in medication care.	107	3(2.7)	5(4.5)	28(25.4)	57(51.8)	17(15.5)	4
12. The nurse teachers supervising the clinical practice have supported me in integrating theory and practice in medication care.	109	1(0.9)	12(10.9)	28(25.4)	54(49.1)	15(13.6)	4
13. The medication education at the school and the medication care in clinical practice have corresponded well.	110	20(18.2)	16(14.5)	45(40.9)	23(20.9)	6(5.5)	3

1 – strongly disagree; 2 – disagree; 3 – neither agree nor disagree; 4 – agree; 5 – strongly agree

(5), resulting in the need to practise it repeatedly in a calm supportive atmosphere. One reason why students could not sufficiently practise medication management might be the fact that it was their first clinical training period, and the nurse mentors did not have enough trust in the students. Another reason may be that the nurse mentor in a busy ward, with a limited number of nursing staff, has no time to arrange high-risk activities like medication management with the student. That, in turn, makes students feel that they are not involved enough or cannot practise medication management enough. Therefore, the higher education institution in cooperation with the practice institution should consider how to provide nursing students with more possibilities for practising medication management. For example, Sulosaari (14) suggested the provision of national recommendations that regulate the amount and content of medication education. Preston et al. (16) emphasized that changes to the curriculum should consider the student evaluations of the current curriculum.

Competencies are evolving throughout the education period; it requires continuous support and adequate supervision. Preston et al. (16) emphasized, on the basis of nursing students' evaluations, the importance of clinical training supervision that corresponds to the current educational level of students, meeting their individual needs. However, in our study, 30% of the students reported they were expected to have higher medication competence in clinical practice than they actually had. The discrepancy between the expected and actual student competence levels may show that nurse mentors are not always paying attention to the current competence levels of students. Nurse mentors may also expect that students who start their clinical practice always have sound knowledge, although previous studies have shown this is not always the case (5, 13, 14). This topic warrants further investigation as medication administration without adequate competence may compromise patient safety.

Students experience opposing requirements and expectations in clinical practice (4). Nurse mentors should try to understand the variety of difficulties often experienced by students while transferring didactic to clinical practice (16, 24). This is confirmed by our study, where only one-fourth of students reported that the medication education acquired at school and the medication care in clinical practice corresponded well. In our study, the students had only started to gain practical clinical experience and, therefore, their understanding of medication management might have been, to some extent, more limited than the staff nurses' understanding. It is possible that experienced staff nurses administer medication in a different way compared

with what is taught to students at school, although it does not necessarily mean that a different way is a wrong way. Nurse mentors and nurse teachers should always be encouraged to discuss the situations that cause difficulties and confusion. There is no reason to ignore student observations highlighting differences in the application of the principle rules, i.e., the nine rights. Everybody should disapprove of the acquisition of wrong and hazardous attitudes to work. Donough and van der Heever (19) suggest that nurse mentors may also need training and needs-based support in order to fulfil the expected role.

Although it might be difficult to implement, higher education institutions should consistently hold nurse mentors responsible for the achievement of learning outcomes regarding medication management and the supervision of student nurses throughout the education period. A study conducted by Reid-Searl et al. (18) demonstrated that 40% of students reported that they had experienced pressure to perform tasks without adequate supervision. In our study, 74.5% of the respondents performed tasks in medication care without adequate supervision. This kind of situation is not acceptable. According to Reid-Searl et al. (4), an internal conflict is induced in students due to inadequate supervision as the requirements set by the educational institution do not often correspond to the realities of clinical practice. In addition, inadequate supervision causes fear and anxiety in students as they are afraid of making medication errors. The fear is probably caused by the fact that students make medication errors in clinical practice (9), and they are aware of the risk to make medication errors. In order to create a sense of security, the nurse mentor should continuously give constructive feedback about student performance (25). In our study, less than half of the students reported receiving feedback from the nurse mentor about their medication competence development.

Ward design, routine and procedures related to medication administration should be emphasized to students, and they must become familiar with each ward design, routine and procedures in order to reduce potential system errors (24). The ratings of 74.5% of the students in our study indicated that they were introduced to the responsibilities and tasks of medication management at the beginning of the clinical training period. Presumably, knowledge of responsibilities and tasks of medication management at the beginning of the clinical training period would also reduce students' anxiety and fear caused by their lack of self-confidence and limited knowledge (5, 24).

Previous studies have shown that the gap between theory and practice in medication management

could be reduced by the promotion of medication education; pre-clinical practice should be increased and teaching methods expanded (5, 15, 16, 27). Development of theoretical instruction requires harmony between theory and practice that can be achieved by the contribution of the nurse mentor, as well as by the nurse teacher who should support the student throughout the education period (26). Although in our study there is a discrepancy between theory and practice, students still reported that the nurse teachers supervising the clinical training supported them in integrating theory and practice in medication care, as well as in setting personal learning goals in medication care. Based on the last two findings, one may assume that the nurse teachers from the schools that participated in this study had made efforts to support students' learning. Previous studies have shown that nurse teachers' positive support perceived by students increases their satisfaction with training in clinical practice (22). Perception of support is a human need experienced in a new and complex situation like any new clinical training period for the student.

A number of studies have been carried out to describe nursing students' experiences in general or their evaluation of clinical training. Few studies have included student evaluations of learning medication management in clinical practice. However, in order to develop the learning of medication management, the evaluation of the skill by nursing students is important. Hence, the results of this study may further the understanding of learning medication management in clinical practice. Nursing students' evaluations should be taken into account in the organization and development of education.

All studies have limitations, including this one. The results cannot be considered representative due to the nature of the applied sampling method (convenience sample) and low response rate. Therefore, the results of the study should be interpreted with caution and the findings are not generalizable. Although the questionnaire was adapted by an expert panel, the adapted questionnaire was not pilot tested among nursing students. Therefore, it is unclear whether the statements included in the question-

naire were fully understood by the subjects and suitable for the exploration of the phenomenon under study.

Conclusion

Based on the results, several recommendations are provided. More attention should be paid to the learning of medication management in clinical practice. Student evaluations should be considered in the development of learning. Nursing students should be given more possibilities to practise medication management in clinical practice, according to their current educational level and the corresponding competence. At the same time, the student should always perform medication care under adequate supervision provided by the nurse mentor. This study revealed the important role of the nurse mentor in the learning process. Therefore, it is necessary to facilitate the creation of a good relationship between the student and the nurse mentor. Nurse mentors should give students supportive feedback as they develop competence. Higher education institutions should contribute more to the correspondence of theory and practice in student learning of medication management. Theory and practice are two major building blocks of nursing education – high quality nursing education requires a dialogue and symbiosis of the two. In current practice, nursing students have opportunities to develop medication management competence, which, in turn, ensures safe medication care for patients.

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Statement of Conflict of Interest

The authors state no conflict of interest.

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